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STUDY OF MATHEMATICS TEACHERS IN ALABAMA. FINAL REPORT.
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TO IMPROVE MATHEMATICS TEACHING, A QUESTIONNAIRE WAS SENT TO 1,000 SECONDARY AND 2,018 ELEMENTARY SCHOOL MATHEMATICS TEACHERS IN ALABAMA. RESPONSES WERE RECEIVED FROM 964 (33.4 PERCENT) OF THOSE QUERIED. AMONG THE FINDINGS WERE (1) 62.5 PERCENT OF THE TEACHERS HAD 4-YEAR OR CLASS B CERTIFICATES, 26.9 PERCENT HAD 5-YEAR OR CLASS A, 3.4 PERCENT HAD 6-YEAR OR CLASS AA, AND 7.5 PERCENT HAD OTHER CERTIIFICATES. (2) THE MEDIAN AMOUNT OF EXPERIENCE WAS 9.4 YEARS, AND THE MEDIAN LENGTH OF SERVICE 3.4 YEARS. (3) 46.3 PERCENT OF THE SECONDARY TEACHERS DID NOT MAJOR IN MATHEMATICS. (4) 39.6 PERCENT OF THE SECONDARY TEACHERS HAD ATTENDED A NATIONAL SCIENCE FOUNDATION PROGRAM. (5) AVERAGE CLASS SIZE VARIED FROM 25 IN ADVANCED CLASSES TO 35 IN ELEMENTARY SCHOOL. (6) 23.4 PERCENT OF THE TEACHERS WITH A MATHEMATIC MAJOR TAUGHT COURSES OTHER THAN MATHEMATICS. (7) 25 TEACHERS DID NOT HAVE A COLLEGE DEGREE, 703 HAD A BACHELOR'S DEGREE, AND 232 HAD A MASTER'S. (8) LESS THAN 10 PERCENT OF THE ELEMENTARY TEACHERS REPORTED COURSES EQUIVALENT TO THE LEVEL OF RECOMMENDATION OF THE COMMITTEE ON THE UNDERGRADUATE PROGRAMS, AND LESS THAN 25 PERCENT OF THE SECONDARY TEACHERS COULD MEET LEVEL TWO REQUIREMENTS. IT IS CONCLUDED THAT (A) RETRAINING PROGRAMS FOR UPPER ELEMENTARY AND JUNIOR HIGH SCHOOL TEACHERS ARE NEEDED, AND (B) SALARIES MUST BE RAISED TO HOLD COMPETENT PEOPLE. (AW)

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Project No. 6-8594-2-12-1
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STUDY OF MATHEMATICS TEACHERS IN ALABAMA

May 31, 1967

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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STUDY OF MATHEMATICS TEACHERS IN ALABAMA

Project No. 6-8594-2-12-1
Contract No. OEC 2-7-008594-0458

Kenneth E. Easterday

May 31, 1967

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INTRODUCTION

It is the opinion of many people concerned with education in Alabama that the mathematics teachers of this state are seriously undertrained. There is no question that there exists a clear need for improvement in the mathematics programs of the schools in the state. The preceding statements imply that factual information pertaining to the mathematics programs of Alabama exists and is available; however, this is not the case. It was the purpose of this study to determine, where possible, factual information about the mathematics teachers in Alabama.

Specific objectives included the following:

1. To determine the ratio of males to females teaching secondary mathematics in Alabama.
2. To determine the certification status of Alabama teachers of mathematics.
3. To determine the amount of teaching experience of Alabama teachers of mathematics.
4. To determine the ratio of teachers of secondary mathematics without a college major in mathematics to the number of secondary mathematics teachers.
5. To determine the major-minor combinations of secondary mathematics teachers.
6. To determine the approximate proportion of mathematics teachers who have taken advantage of the National Science Foundation Institutes.
7. To determine the recency of training of former/current members of N. S. F. Institutes.
8. To determine the colleges offering N. S. F. Institutes which Alabama teachers have attended.
9. To determine the mathematics courses currently being offered in Alabama public schools.
10. To determine the size of mathematics classes in Alabama's elementary and secondary schools.
11. To determine the extent and recenty of inservice training programs in mathematics of Alabama public schools.

12. To determine the proportion of trained mathematics teachers teaching in areas other than mathematics.

13. To determine the academic preparation of Alabama mathematics teachers.

14. To determine, by course title, an approximation of the training in mathematics of teachers as compared with CUPM recommendations.

METHOD

A questionnaire was developed and designed such that answers to the specific questions would yield information pertaining to the specific objectives and other more general questions. A copy of the questionnaire may be found in Appendix A.

The most recent school year, 1965-66, listing of Alabama teachers of mathematics by the Alabama State Department of Education identified 1,647 secondary mathematics teachers. This list did not include teachers in schools which were not accredited by the State Department of Education. Since the number of teachers in nonaccredited junior high schools was large and the need for accurate information was imperative, the investigator asked the State Department of Education for each school system's 1966-67 report. The reports of two city systems and eight county systems were not available from the State Department; however, these systems supplied the investigator with a list of teachers in their respective systems. In some cases, the system failed to identify the assignment of a teacher. Students in the investigator's class at Auburn University were asked to identify the mathematics teachers in their home community. A final list of 2,395 names of mathematics teachers in Alabama was made. This list indicated the name of the system and the teachers name.

Since the original plan called for 1,000 secondary mathematics teachers to be sampled and the size of the systems varied greatly, the same ratio of 1000/2395 or 42 percent of the mathematics teachers from each system were sampled. The specific teachers were identified by the use of a table of random numbers.

An identical course of action was followed for the elementary teachers. In this case, 2018 questionnaires were mailed. This was equivalent to 2018/15214, or 13 percent, since 15,214 elementary teachers were identified. For purposes of this study, grade seven and above were defined to be secondary grade level.

The responses of the returned questionnaires were entered into IBM punch cards. The results were then tallied by the use of the IBM 7040 computer. Single cross tabulations with stacking were made.

RESULTS

Of a total of 3,018 questionnaires mailed, 128 were returned undelivered making an effective sample of 2890. Of the total effective sample, there were 972, 33.6 percent, of the questionnaires returned. Only eight of the returns were not usable. Thus, 964 questionnaires or 33.4 percent of the effective sample were used in the study.

Respondents to the questionnaire indicated that there were at least 24 different school organizations in Alabama. The most common grade organizations indicated were the following: (1) grades 1-6, 275 responses, (2) grades 1-12, 229 responses, (3) grades 7-12, 79 responses and (4) grades 1-9, 77 responses. A detailed listing of the grade organizations may be found in Table I of Appendix B.

The size of the schools represented by the respondents varied also. Of the 942 respondents who indicated the size of the school in which they were teaching, 391 teachers were in schools with a student enrollment of 401-800. A total of 852 teachers replying were teaching in schools with an enrollment between 201 and 1200. Only 22 teachers were in schools with an enrollment of under 100 students and 25 teachers were in schools with an enrollment of over 2,000. Table II of Appendix B gives the frequency distribution of the number of teachers as related to school enrollment.

The schools under 100 enrollment as represented by teacher responses were predominantly organized on the 1-6 plan. Two teachers were employed in schools organized on the 1-12 plan with under 100 students, and one junior high school with an enrollment of 100 students or less was reported.

Nine respondents were employed in schools organized on the 10-12 plan with over 2,000 enrollment. Also eight teachers in schools organized on the 1-12 plan and four teachers in schools organized on the 8-12 plan represented schools with over 2,000 students. A complete breakdown of school size and organization may be found in Table III of Appendix B.

Objective I: To determine the ratio of males to females teaching secondary mathematics in Alabama.

Of 964 total responses 230, or 24 percent, were men and 666 women, 69 percent. Sixty-eight, or 9 percent, of the respondents failed to indicate their sex.

Of the 230 male respondesnts, three did not indicate their certification status. Four of the men held administrative certificates. Only twelve of the men held elementary certificates and an additional twelve men held elementary-secondary certificates. The majority of men, 174 or 76.7 percent, held secondary teaching certificates. Of the remaining 25 men, 23, or 10 percent of the total, possessed emergency certificates and two men held certificates which are no longer issued by the State of Alabama. Only eleven men, less than 5 percent of the men, hold AA certificates representing two years of graduate work. Approximately 31.8 percent of the men possessed Class A certificates representing one year of graduate work.

The men held 41.5 percent of 419 secondary certificates reported as contrasted to only 3.1 percent of 392 elementary certificates. A total of 70 emergency certificates and certificates no longer issued were reported and the men held 25 or 35.6 percent of these. Of the 32 six-year AA certificates reported by all teachers, 34.4 percent were held by men and the men held 29.9 percent of the five-year or Class A certificates reported.

One woman held a Class A guidance certificate and 15 women failed to indicate their certification status. A total of 346 women, or 52.0 percent of all female respondents, held elementary certificates and 226, 33.9 percent, held secondary certificates. Thirty women, 4.5 percent, reported emergency certificates and eight women held certificates no longer issued. Thirty-nine, 5.9 percent, of the women reported elementary-secondary certification.

Of the total number of secondary certificates reported, women held 53.9 percent. However, the women reported 88.3 percent of the elementary certificates and 66.1 percent of the elementary-secondary certificates. With regard to the emergency certificates and certificates no longer issued, women reported 55.7 percent.

Nineteen women reported 59.4 percent of the total number AA certificates reported. Of the total, 254 Class A certificates, female teachers reported 154 or 60.6 percent. In all 589 Class B certificates were indicated with 74.5 percent of these reported by women.

Of the 68 individuals who did not indicate their sex, they reported the following breakdown: 34 or 50 percent, elementary certificates, 8 or 11.8 percent, elementary-secondary, 6 or 8.8 percent, emergency, and 19, 27.9 percent, secondary. Two of these respondents held an AA certificate, 24 a Class A certificate, and 35 a Class B certificate. In Appendix B, Table IV indicates the breakdown of certificates by sex.

Although a respondent normally indicated that the teacher taught more than one mathematics course, the sex of the teacher as related to the course taught indicated the relative number of teaching positions as related to sex. Only one man indicated that he taught in the primary grades, i.e grades 1-3. Twenty-eight teaching positions in grades 3-6 were filled by men. In contrast, 255 primary and 224 intermediate teaching positions were reported by women. A total of 45 teaching positions reported in the elementary grades were not identified by sex. The men filled 5.2 percent of the elementary teaching positions reported and the women 86.6 percent.

Of 965 teaching positions in grades 7-12 reported, 48.3 percent were held by men, 45.9 percent by women, and 5.8 percent did not indicate their sex. There were 308 teaching positions in grades seven and eight reported. These positions were distributed evenly between men, 146 or 47.4 percent, and women, 144 or 46.8 percent. Eighteen teachers of mathematics in grades seven and eight did not indicate their sex.

General mathematics in grades nine through twelve are combined throughout this report. Combining teaching positions in general mathematics, business mathematics, and shop mathematics, the total number of such positions reported was 162. Of these positions 85, 52.5 percent, were held by male teachers and 63 or 38.9 percent were held by females. The remaining 14 positions were occupied by teachers who failed to indicate their sex.

Algebra classes for grades seven, eight, and nine were considered together. There were 166 such teaching posts with 81 or 48.9 percent of the positions reported by men and 75, 45.2 percent, reported by women. There were 121 positions reported in geometry with 64, 52.3 percent, and 53, 43.8 percent, reported by men and women respectively.

When all mathematics normally taught in grades seven through ten was considered, 757 teaching posts were reported. Men held about 50 percent of these positions and women reported 44 percent of such positions.

However, of 107 positions in Algebra II, the women reported 56, 52.3 percent, and men reported 44, 41.1 percent. Similarly, women reported 51.2 percent of the positions in advanced mathematics with men indicating that they held 46 or 45.5 percent of these positions. A grouping of Algebra II, geometry, and advanced mathematics gave 329 teaching stations of which 48.9 percent were reported by females and 46.8 percent reported by males. However, a grouping of positions in general mathematics, beginning algebra, and mathematics in grades seven and eight revealed that 49.1 percent of such positions were held by men and 44.3 percent were held by women. A detailed table, Table V is Appendix B, gives additional data pertaining to sex of the teacher and teaching assignments.

With regard to marital status, 28 of the 230 men failed to indicate their status. Of the men, 4 were widowers, 14, 19.2 percent, were single, and 154, 67.0 percent were married.

Two of the women were divorced and 21 failed to indicate their marital status. Of the remainder there were 117 or 17.3 percent single and 470 or about 71 percent of the women were married.

Of the total sample of 964, 69.6 percent were married, 17.5 percent single, 7.5 percent widowed or divorced, and the remaining 5.6 percent failed to indicate their marital status.

Objective II: To determine the certification status of Alabama teachers of mathematics.

In the preceding section, a report of data relating to the sex of the teacher and certification was made. There was four administrative certificates, one guidance certificate, and one special education certificate reported. Of 945 certificates reported, 70 or 7.5 percent of the teachers reported emergency certificates or certificates no longer in issue. Only 32 or 3.4 percent of the respondents reported a "AA" or six-year certificate. The majority, 589 or 62.5 percent, of teachers indicated possession of a four-year or Class "B" certificate. The remaining 26.9 percent of the teachers indicated the five-year or Class A certificate.

Of the 276 teaching stations reported for grades 1-3, no information was available for five. Considering only the 271 stations for which data were reported, 4.1 percent of these positions were filled by teachers with emergency or out-dated certificates. In addition, 11.8 percent of these positions were filled by teachers with a secondary certificate. Thus 16.9 percent of the primary teaching positions reported were filled with teachers not trained for that position. Another 4.8 percent of the positions were held by teachers with an elementary-secondary certificate.

The remaining 215 teaching positions reported in the primary grades were filled with teachers who possessed an elementary certificate. Only eight of these teachers held a six-year certificate and 51 had the five-year certificate. Therefore, of the 271 stations for which certification data were available, 21.8 percent were filled with teachers with advanced training in the elementary school. The complete breakdown of certification status of teacher positions in the primary grades is given in Table I of Appendix C.

There were 278 teaching stations reported in grades 4-6. Teacher certification data were available for 272 stations. Of these 272 stations, 17 or 6.2 percent, were reported by teachers with an emergency certificate or a certificate which is no longer issued. An additional 51, 18.7 percent, of these positions were indicated by teachers with secondary certification. Approximately 25 percent of these intermediate positions were reported by teachers either out of their field or improperly certified. Also, 19.2 percent of these positions were reported by teachers with elementary-secondary certification which is not issued in the field of mathematics.

Only 65.8 percent of the positions reported for intermediate grades were filled by teachers with elementary certificates. Only four of these 179 positions had teachers with the six-year certificates and 45 positions were reported by teachers with the five-year certificate. Additional data are given in Table I of Appendix C.

Available data on the 542 elementary positions reported indicated that 72.6 percent of these positions are filled with teachers holding an elementary certificate. Approximately 20 percent of the positions were filled by teachers holding an advanced elementary certificate. The remaining positions were filled by teachers holding the following certificates: (1) Elementary-secondary certificates, 7.0 percent, (2) Emergency certificates or certificates out of issue, 5.2 percent, (3) Secondary certificates, 15.3 percent. More complete information is in Table I of Appendix C.

Of the 308 teaching positions reported in grades seven and eight, data were available on 304. Only 68.1 percent of these positions were filled by teachers with secondary certification. Holders of emergency certificates reported 11.5 percent of these positions and possessors of elementary or elementary-secondary certificates indicated 16.8 percent of the positions in grades seven and eight. Less than 25 percent of the positions were reported by teachers with any advanced secondary certificate. The area of secondary certification was not sought. See Table II in Appendix C for additional information.

Shop mathematics, business mathematics, and general mathematics were considered together and 159 such teaching positions were reported. Of the 156 for which certification data were available, the distribution of non-secondary certification was as follows: (1) 6 elementary certificates, (2) 17 emergency certificates, (3) 8 elementary-secondary certificates, (4) 2 others. There were 21.2 percent of the positions held by teachers without secondary certification.

Of the 123 positions in shop, business, or general mathematics held by teachers with a secondary certificates the majority, 73, were filled by teachers with the four-year or Class B certificate. This was 46.8 percent of all such positions. The remaining 50 positions were filled with teachers who possessed a Class A or Class AA certificate. A completed tabulation of general mathematics, shop mathematics, and business mathematics positions, as related to certification, is reported in Table II of Appendix C.

Of 166 beginning algebra positions, certification data were available for all but one. Non-secondary certificated personnel held 21 or 12.7 percent of these positions. Of the 21 positions, personnel with elementary or elementary-secondary certification occupied 9 positions and 8 positions were filled with holders of an emergency certificate. The remaining 144 positions with secondary certification were divided as follows: (1) 78 Class B certificates, (2) 61 Class A certificates, (3) 5 Class AA certificates. Of the total group, 40 percent of the positions were filled by teachers who possessed an advanced secondary certificate. Table II in Appendix C gives supplementary data.

In the area of geometry, 8.5 percent of the positions were filled by teachers with emergency certification. Approximately 88 percent of the 118 geometry positions for which data were available were filled by teachers with secondary certification. Holders of Class A or Class AA secondary certificates reported 33.1 percent of all geometry positions. See Table III in Appendix C for additional data.

Fifteen teachers with elementary, elementary-secondary, emergency, or temporary-type certificates filled 16.1 percent of the 107 Algebra II positions. No certification information was given by one teacher. Of remaining positions, 47 teachers, or 44.3 percent of the total, had Class B secondary certificates and 41.5 percent of the total Algebra II teachers had Class A or Class AA certificates. Table III in Appendix C gives a classifications of geometry by certificates.

In the areas of advanced mathematics and trigonometry, 18.0 percent, 18 of 110, of these positions were filled by teachers who did not report a secondary certificate. Of the 18 positions, 9 were reported by individuals with emergency certificates. Of the remaining 82 positions, 39 were reported by holders of the Class A or Class AA certificate. The remaining 43.0 percent of the total positions were reported by teachers with Class B secondary certificates. See Table III in Appendix C for a more detailed analysis of the advanced mathematics positions. Table X in Appendix C combines second year algebra, geometry, and advanced mathematics with regard to certifications status.

Objective III: To determine the amount of teaching experience of Alabama teachers of mathematics.

The responses to the questionnaire indicated that the average number of years which a respondent had been employed in his current position was 7.1 years. However, the median number of years service to the current school was 3.4 years. The median for female teachers in the same school was 3.8 years as compared to 2.5 years for males. The respondents who did not indicate their sex had been employed by the school for 5.5 years. Over 20 percent of the respondents were first year teachers in their school and approximately one-third of the respondents were first or second year teachers.

The mean number of total years experience for all teachers answering the questionnaire was 12.8 years with a median of 9.4 years experience. The median number of years experience for women was 9.6 years and the median for men was 5.9 years. For those teachers who did not indicate their sex, the median was 18.0 years. Only 7.8 percent of all teachers were first year teachers and 15.8 percent were first or second year teachers. Table I and Table II of Appendix D indicate a more complete breakdown of teaching experience with respect to the sex of the teacher.

When the teaching experience of teachers was resolved by grade level or subject, the average length of service of first grade teachers to their current school was 7.8 years as contrasted with 16.1 years, the average of their total experience. The median length of service of first grade teachers was 4.3 years and the median number of years of total teaching experience was 15.1 years. Only 8.4 percent of the first grade teachers were first year teachers although 20.4 percent of these same teachers were new to their school. However, 16.8 percent of the first grade teachers were either first or second year teachers and 30.1 percent of the teachers had been with their current school less than two years.

The mean length of total experience of second grade teachers was 12.4 years and their mean length of service to their current school was 7.6 years. The medians were 8.6 years and 3.0 years respectively. The percent of first year teachers in grade two was 14.8 percent and there were 31.3 percent of the second grade teachers who were new to their school this year. Approximately one fourth of the second grade teachers have less than two years experience and 38.8 percent of the second grade positions reported were staffed by teachers who had been with their school one year or less.

The third grade teachers reported a mean of 15.0 years and a median of 13.8 years of total teaching experience. They had served their current school a median of 2.6 years with a mean of 6.9 years. There were 15.7 percent of the third grade teachers who were new to the school and an additional 12.7 percent of the teachers had been with the school only one year. Only 12.9 percent of the third grade teachers reported less than 2 years teaching experience.

The primary grade, grades one, two, and three, teachers had a mean of 14.6 years total teaching experience and a median of 11.7 years. They had served their current school a mean of 7.4 years with a median of 4.0 years. There were 21.8 percent of the primary teachers new to their school although 10.1 percent of the teachers were first year teachers. Nearly one-third of these teachers had been with their school less than two years as compared to 17.7 percent of the teachers reporting less than two years experience. Table III and Table IV in Appendix D reflects the experience of primary teachers, by grades, in their current school and their total teaching experience.

The fourth grade teachers reported being with their current school a mean of 8.9 years with a mean of 14.7 years total teaching experience. The medians were 5.8 years and 11.5 years respectively. Approximately one-fourth of the teachers had been with their current school less than two years with about one-sixth of the fourth grade teachers new to their schools. With regard to total teaching experience for fourth grade teachers, 6.0 percent were first year teachers and 10.7 percent had less than two years experience.

The fifth grade teachers indicated that only 6.8 percent were first year teachers and 12.5 percent had one year or less teaching experience. The mean amount of total teaching experience reported was 14.1 years with a median of 12.2 years. However, approximately 50 percent of all fifth grade teachers had been with their current school three years or less. Nearly 30 percent had been employed by the school one year or less and 14.9 percent were new to the school. The mean number of years service to their current school was 7.2 years.

The sixth grade teachers reported a mean of 8.1 years service to their current school and a mean of 14.1 years of total teaching experience. The respecitve medians were 4.2 years and 11.7 years. Only 3.9 percent of the sixth grade teachers indicated that they were first year teachers although 21.8 percent of the teachers were new to their school in 1966-67. Over one-fourth of the teachers had less than 2 years service to their current school and 10.8 percent of the sixth grade teachers had less than 2 years total teaching experience.

When the responses of teachers in grades four, five, and six, were considered together, 5.5 percent of the teachers were first year teachers and 11.3 percent had one year or less total experience. The mean length of teaching experience was 14.3 years with a median of 11.8 years. The mean length of service to the school was 8.0 years. The median length of service to the school was 4.4 years with 28.0 percent reporting one year or less and 17.8 percent of these teachers were new to the school. Table V and Table VI in Appendix D reports a more complete analysis of the experience of teachers in grades 4, 5, and 6.

Teachers of seventh grade arithmetic reported a mean of 10.4 years teaching experience with a median of 6.3 years. These teachers indicated a median of 2.8 years service to the school and a mean of 5.7 years. Over 20 percent of the seventh grade teachers were new to the system although only 5.6 percent of them were first year teachers. There were 35.9 percent of the teachers who had been with the school one year or less and 15.5 percent reported one year or less total experience.

The pattern for eighth grade mathematics teachers was similar. Their responses indicated the same mean and median amount of service to the school. The mean and median total teaching experience of eighth grade teachers, 10.0 years and 6.0 years, were slightly lower than those of the seventh grade teachers. One-fourth of the eighth grade teachers were new to their school and over one-third of these teachers had been with their school less than 2 years although only 8.4 percent were first year teachers. A breakdown of the teaching experience of seventh and eighth grade mathematics teachers is reported in Table VII and Table VIII of Appendix D.

Teachers of beginning algebra reported a mean of 12.0 years total teaching experience with a mean of 6.4 years service to their current school. The respective medians were 7.7 years and 3.5 years. About one-fifth of these teachers are new to their school this year although only 4.8 percent are first year teachers. There were 32.2 percent of the teachers with one year or less service to their current school and 14.4 percent of the teachers had one year or less total experience. Table IX and Table X in Appendix D indicates the experience of those teachers who teach algebra in grades seven, eight, or nine.

General mathematics teachers indicated a mean of 10.3 years total teaching experience. The median of the total teaching experience of general mathematics teachers was 6.1 years. About one of every five teachers had one year or less total experience and 12.8 percent were first year teachers although 25.7 percent of the general mathematics positions in a given school were held by teachers new to the school in 1966-67. The median length of service of general mathematics teachers to their current school was slightly over 2 years with a mean of 5.1 years. See Table IX and Table XII of Appendix D for additional details.

Over 20 percent of the geometry teachers were new to their school this year and over one-third had been with the school less than two years. The mean length of service of geometry teachers to their current school was 6.7 years but

50 percent of the teachers of geometry had served their current school less than four years. Over 50 percent of the geometry teachers had less than 7 years of experience although only 5.9 percent were first year teachers.

Algebra II teachers exhibited a pattern of experience to their current school nearly identical to the geometry teachers. However, the median of total experience for Algebra II teachers was 5.4 years with a mean of 11.4 years. Only 4.7 percent of the second year algebra teachers were first year teachers and one of six had one year or less total experience.

In contrast, the advanced mathematics teachers reported a median 10.0 years of teaching experience and only about 10 percent were teachers who were first or second year teachers. The mean of their total teaching experience was 13.0 years. However, the advanced mathematics teachers had served their current school a mean of 7.2 years with a median 4.3 years. Over 20 percent of the advanced mathematics teachers were new to their current school.

When the responses of teachers of second year algebra, geometry, and advanced mathematics were combined, these teachers had a mean of 11.5 years total teaching experience. However, half of these teachers had less than 8 years experience in the classroom although only 4.9 percent were first year teachers. Over one-third of these teachers had been with their current school one year or were new to the school. The median length of service to their present school was 3.6 years. Supplementary details are given in Table XI. . and Table XII of Appendix D.

Objective IV: To determine the ratio of teachers of secondary mathematics without a college major in mathematics to the number of secondary mathematics teachers.

The ratios and percentages of teaching positions filled by teachers reporting a major in mathematics were as follows:

1. Mathematics 7 and 8, 99/308 or 32.1 percent.
2. General mathematics 9-12, 79/144 or 54.9 percent.
3. Business and shop mathematics, 10/17 or 58.8 percent.
4. Beginning algebra, 99/167 or 59.3 percent.
5. Second year algebra, 75/107 or 70.1 percent.
6. Geometry, 58/121 or 70.2 percent.

7. Advanced mathematics 73/102 or 71.6 percent.
8. All secondary mathematics classes excluding business and shop mathematics, 510/949 or 53.7 percent.

The ratios and percentages of teaching positions filled by teachers reporting a minor in mathematics were as follows:

1. Mathematics 7 and 8, 75/308 or 24.4 percent.
2. General mathematics 9-12, 38/144 or 26.5 percent.
3. Business and shop mathematics, 4/17 or 23.5 percent.
4. Beginning algebra, 43/167 or 25.7 percent.
5. Second year algebra, 24/107 or 22.4 percent.
6. Geometry, 21/121 or 17.4 percent.
7. Advanced mathematics 25/102 or 24.5 percent.
8. All secondary mathematics classes excluding business and shop mathematics, 226/949 or 23.8 percent.

The majors of all teachers are given in Table I of Appendix E.

Objective V: To determine the major-minor combinations of secondary mathematics teachers.

There were 320 teachers who reported two majors. However, 69 of these were reported by teachers with a major in elementary education. Thus, there were 251 teachers who reported a double major and did not have a major in elementary education.

Of the 40 teachers who reported a major in addition to the major in mathematics, four reported a major in elementary education. Of the remaining 36 teachers, 13 reported the second major of social sciences. Nine mathematics teachers reported the additional major in the following areas: (1) English-3, (2) foreign language-3, (3) business eudcation-3. There were five teachers with double majors in mathematics and science and two teachers with majors in mathematics and education. Agriculture, industrial arts, physical education and religion were each mentioned as the second major by one teacher. A complete breakdown of double majors reported is given in Table I of Appendix F.

Of the total sample, there were 241 majors in mathematics reported. Of these 40 had double majors as previously discussed. The minors of those individuals reporting a mathematics major were as follows:

English	53
Social Studies	52
Physical Science	35
Natural Science	27
Biological Science	21
Physical Education	14
Business Education	10
Foreign Language	7
Religion	5
Speech	4
Psychology	3
Music	3
Others	7

Excluding elementary education, other frequent majors reported were English, social science, and science.

There were 122 teachers reporting a minor in mathematics. Home economics, mathematics, psychology, and religion were each reported once as a major by teachers minoring in mathematics. The majors of other mathematics minors were as follows:

Biological Science	24
Physical Science	22
Social Studies	22
English	10
Elementary Education	9
Business Education	6
Physical Education	5
Natural Science	5
Liberal Education	5
General Science	3
Agriculture	3
Foreign Language	2
Music	2

Other minors, regardless of the majors, which were mentioned frequently were social studies, English, and branches of science. Table II of Appendix F identifies all major-minor combinations reported.

Objective VI: To determine the approximate proportion of mathematics teachers who have taken advantage of the National Science Foundation Institutes.

The respondents to the questionnaire were asked to indicate if they had attended a National Science Foundation Institute. No reference was made to the length of time which the institute was in session.

Some teachers in the elementary grades indicated that they had attended a National Science Foundation Institute. Of 278 teaching positions in the primary grades, teachers in nine of these positions responded that they had attended National Science Foundation Institutes. Teachers in 15 of 278 intermediate classes indicated that they had attended such an institute.

In grades seven and eight, teachers in 88 of the 299 positions, 29.4 percent, for which data was available indicated that they had attended a N.S.F. Institute. In general mathematics, 48.4 percent or 46 of 95 respondents indicated attendance at an N.S.F. Institute and 42.4 percent, 76 of 165, of the teachers of beginning algebra answered in the affirmitive. About half of the positions in both geometry and second year algebra were filled by teachers who indicated that they had attended an institute sponsored by the National Science Foundation. There were 105 second year algebra positions and 119 geometry positions. In advanced mathematics, 46.7 percent, 47 of 99 positions were filled by teachers attending such an institute.

By actual count 115 teachers indicated that they had attended a National Science Foundation Institute. Excluding positions in shop or business mathematics, 369 of 928, or 39.8 percent of the positions at the secondary level were held by teachers who had attended a N.S.F Institute.

Objective VII: To determine the recency of training of former/current members of N.S.F. Institutes.

One teacher reported attending a National Science Foundation Institute in 1957 and another teacher reported attending in 1958. Eleven teachers attended an Institute from 1957 to 1960. Twelve teachers attended in 1961 and seven in 1962. There were 125 teachers who reported attending a N.S.F. Institute since 1962. A total of 50 respondents indicated that they had attended a N.S.F. Institute in 1966.

Objective VIII: To determine the colleges offering N.S.F. Institutes which Alabama teachers have attended.

Of the 155 teachers who indicated that they had attended a N.S.F. Institute, 102 or about two-thirds of the teachers reported attending institutes in Alabama. The University of Alabama was mentioned by 34 teachers and Auburn University was mentioned by 25 secondary mathematics teachers. Table I of Appendix G gives the frequency distribution for all Alabama colleges reported.

There were 22 other teachers who reported attendance at N.S.F. Institutes in the states of Georgia, Louisiana, Mississippi, Tennessee, North Carolina, and South Carolina. Nine teachers reported attendance at Georgia colleges and universities. A breakdown of attendance in the Southern colleges is given in Table II of Appendix G and Table III lists the frequency of attendance at all other colleges.

Objective IX: To determine the mathematics courses currently being offered in Alabama public schools.

In the elementary grades, no division of mathematics courses beyong the normal grade level division was sought. There were classes of special education reported by the grade level division was not indicated.

The responses to the questionnaires indicated that some schools were teaching algebra in grades seven and eight. Some general mathematics was reported beyond the normal ninth grade level and teachers indicated that shop and business mathematics were considered as mathematics courses. Only five teachers indicated that they taught solid geometry. Trigonometry, as a separate course, was reported. No breakdown of the advanced mathematics was sought. See Appendix H for additional details.

Objective X: To determine the median size of mathematics classes in Alabama's elementary and secondary schools.

The teachers were asked to indicate their "average" class size. The term "average" was left undefined. Also, since many teachers teach one or more grades or more than one area in secondary mathematics, their responses were counted under each grade or area which the teacher indicated.

The approximate median size of first grade classes was 30 students. One teacher reported a class of 50 pupils. The most common class size reported for first grade was 30.

In grade two, the median class size was 32 pupils. Classes of 30 and 35 pupils were reported most frequently. Again a class of 50 pupils was reported.

More third grade teachers reported a class of 35 pupils than other class sizes. There were 24 teachers who reported a class size of 32 or 33 pupils. The upper limit was again 50 with a median of 33 pupils.

When grades 1-3, the primary grades, were considered together, a median class size of 32 pupils was reported. The class size most frequently reported was 30. Almost 50 percent of the teachers reported classes ranging from 29 to 36 students. A more complete breakdown of all elementary classes is given in Table I of Appendix I.

With regard to grades four, five, and six, the median class size was again reported as 32 pupils. The largest class reported was again 50 pupils with almost 50 percent of the teachers reporting classes between 29 and 36 pupils. Teachers in grades four and five reported classes of 30 and 35 pupils most frequently. The median class size in grades four and five was 32. The median and mode of the class sizes reported by sixth grade teachers was 30 pupils.

Teachers of seventh and eighth grade mathematics classes reported a median class size of 30 pupils for both grade levels. A class size of 30 was reported most often by the seventh and eighth grade teacher although an average class size of 35 pupils was also frequently reported. The largest class of eighth grade pupils was 44. Table II of Appendix I identifies the class size of seventh and eighth grade mathematics classes in addition to the general mathematics class sizes. The teachers of general mathematics also reported a median class size of 30 pupils and the maximum class size reported for general mathematics classes was 40 pupils.

The classes normally considered as college preparatory classes were reported as smaller than the general mathematics classes although the mode for beginning algebra, Algebra II, geometry, and advanced mathematics classes was 30 pupils. The median class size of geometry and advanced mathematics classes was 25 students. The medians for beginning algebra and second year algebra were 28 and 26 respectively. The largest class of beginning algebra reported was 44 pupils. Second year algebra and geometry each reported a maximum of 40 pupils and the largest advanced mathematics class reported was 36 pupils. There were about ten teachers in each of the four areas who reported a class size under 20 pupils. Supplementary details are given in Table III of Appendix I.

Objective XI: To determine the extent and recency of in-service training programs in mathematics of Alabama public schools.

There were 81 teachers who indicated that they had attended an institute other than an institute sponsored by the National Science Foundation. All these teachers attended their institute since 1959 with 56 teachers attending in 1965 or 1966. Of those who attended such institutes, 14 were male and 59 were female. Eight of the 81 respondents failed to indicate their sex. These 81 teachers represented the following positions:

1. Grades 1-3, 25 positions.
2. Grades 4-6, 40 positions.
3. Grades 7-8, 31 positions.
4. General mathematics 9-12, 6 positions.
5. Beginning algebra, 12 positions.
6. Second year algebra, 4 positions.
7. Geometry, 26 positions.
8. Trigonometry and advanced mathematics, 31 positions.
9. Shop and business mathematics, 7 positions.
10. Special education, 4 positions.

Of the 81 teachers who had attended an institute sponsored by others than the National Science Foundation, 11 teachers had also attended a National Science Foundation Institute. There were 606 teachers in the sample who had attended no institutes regardless of the sponsor.

There were 555 teachers who indicated that they had had an in-service training. Of these, 277 had 12 clock hours of in-service training. There were 37 teachers who failed to indicate the length of time of their in-service training program. Of the remaining 79 teachers, 68 reported that the length of their training was from 27 to 54 clock hours and 21 reported more than 55 clock hours.

The teachers were also asked the sponsor of the in-service training program. The most prevalent sponsor was the local school district which was reported by 414 teachers. Also 37 additional teachers reported that the local school district cooperated with either the State Department of Education or a college in sponsoring in-service training programs.

The State Department of Education was reported as sponsor of the in-service training program by 46 teachers in addition to the 24 workshops which the State Department co-sponsored with the local district. Colleges were listed as sponsors by six teachers and the National Science Foundation was listed as sponsor by seven teachers. According to two teachers, the State Department of Education and a college co-sponsored their workshops.

Three teachers indicated that they had attended the in-service training program prior to 1950 and four teachers reported attending in-service training programs from 1950 to 1959. All other teachers indicated participation in in-service training programs since 1959. The distribution since 1959 was as follows:

1. 1960, 5 participants.
2. 1961, 3 participants.
3. 1962, 10 participants.
4. 1963, 12 participants.
5. 1964, 47 participatns.
6. 1965, 108 participants.
7. 1966, 233 participatns.
8. 1967, 109 participants.

Objective XII: To determine the proportion of trained mathematics teachers teaching in areas other than mathematics.

Teachers with a major in mathematics indicated that they also teach in 15 other areas. The area and the frequency which the areas were reported is given in Table I of Appendix J. The areas most frequently mentioned were physical science, general science, and physical education.

There were 241 teachers who reported a major in mathematics and there were 56 cases reported of these teachers teaching in areas other than mathematics. Thus, approximately 23.4 percent of the teachers with a major in mathematics teach outside the area of mathematics.

Objective XIII: To determine the academic preparation of Alabama mathematics teachers.

Of 964 respondents, 25 had not completed a baccalaureate degree. Included in this group were 18 women and 4 men. Three teachers without the baccalaureate did not indicate their sex.

Two of the 25 teachers had not completed 25 quarter hours and one teacher had completed more than 200 quarter hours. Five teachers reported completion of between 176 and 200 quarter hours. The remaining 17 teachers had completed between 50 and 175 hours.

Thirteen teachers who had not completed their degree held an Emergency certificate. The Defense certificate and the Class B elementary certificate were each reported by four teachers. Two teachers without a degree reported a Class B secondary certificate and one teacher reported a Rank III certificate. One non-degree teacher did not indicate his certificate.

The remaining 939 teachers reported the year in which they received their initial degree.

Year of Degree	Number of Teachers
Before 1935	57
1935 - 1939	59
1940 - 1944	57
1945 - 1949	93
1950 - 1954	168
1955 - 1959	156
1960 - 1964	213
1965 -	136
	939

The teachers were also asked to indicate their highest degree and the year in which that degree was received. Four teachers replied that they had the degree Master of Education but failed to indicate the year, and 72 teachers who had received a baccalaureate degree did not indicate if they had received a higher degree. Thus, 863 teachers indicated their highest degree and the year in which the degree was received.

Year	B.S. B.A.	M.S., M.A.T. M.S., M. Ed.	SP. Ed.	Total
1920-25	3			3
1926-30	8	2		10
1931-35	13	1		14
1936-40	36	6		42
1941-45	32	4		36
1946-50	54	12		66
1951-55	110	36	1	147
1956-60	119	71	2	192
1961-65	201	66		267
1966-	55	30	1	86
	631	228	4	863

Of the 631 teachers with a baccalaureate degree, 247 indicated that they were working on an advanced degree and 40 of the teachers with a five-year degree stated that they were also taking additional course work. Three teachers replied that they were taking advanced work but failed to indicate their highest degree and one person with the Specialist in Education reported additional work. A total of 291 teachers indicated that they were working toward a higher degree.

There were 282 teachers who indicated the number of quarter hours which they had completed above their highest degree.

Quarter Hours	B.S. B.A.	M.A., MA.AT. M. ED., M.S.	Sp. Ed.	Total
1-10	85	18	1	101
11-20	65	7		72
21-30	41	7		48
31-40	25	5		30
41-50	11	5		16
51-60	1	3		4
61-70	5			5
71-80		1		1
81-90		2		2
	223	48	1	282

Of 269 positions reported in grades 1-3, 217, 80.5 percent, were filled by teachers with a baccalaureate degree. There were 50 positions filled by personnel with a degree representing one year of graduate work and two positions were reported by personnel with the degree of Specialist in Education.

Data were available for 270 positions in grades 4-6. Of these, 220 or 81.5 percent of the positions were filled by personnel with a baccalaureate. The remaining positions were filled by personnel with a master's degree.

Of 280 positions reported in grades seven and eight, 81.7 percent, 219 positions, were reported by teachers who had received only the initial degree. Two of the remaining positions were reported by personnel with the specialist's degree and 59 positions were reported by teachers with a master's degree. Approximately one of three positions, 46 of 139, in general mathematics were reported by teachers with a master's degree.

There were 164 beginning algebra positions reported by degree holders. There were 2 positions reported by specialists and 61 by master's degree personnel. The remaining 61.6 percent of the positions were reported by personnel with a bachelor's degree.

Of the 175 positions reported in second year algebra, 74.8 percent, 131, were held by teachers with a baccalaureate. One person with a specialist taught second year algebra and the remaining 43 teachers possessed a master's degree.

There were 38 geometry positions reported by teachers with a master's degree and 80 positions, 67.8 percent of the total number reported, were held by individuals with a four-year degree. Of 94 positions reported in trigonometry and advanced mathematics, 53.2 percent were reported by teachers with a baccalaureate. One teacher with a six-year degree, specialist in Education, teaches advanced mathematics.

The teachers were also asked to indicate the year of their last course in professional education and their last course in mathematics. Not all teachers answered both questions. The responses from the teachers holding positions in grades 1-3 were as follows:

	Professional Education	Mathematics
1930		6
1931-35	1	3
1936-40	1	10
1941-45	4	7
1946-50	8	23
1951-55	32	30
1956-60	36	38
1961-65	74	84
1966-	79	25

Approximately one-third of the primary teachers have not had a professional education course since before 1961 and over one-half of these respondents have had no mathematics course since 1960. In the area of mathematics the situation was similar for teachers in grade four through six.

About two of every five teachers in grades 4-6 have not had a course in professional education since before 1961. For grades 4-6, the results were:

Year	Professional Education	Mathematics
1930	1	5
1931-35		7
1936-40	7	8
1941-45	3	6
1946-50	19	24
1951-55	27	28
1956-60	42	32
1961-65	76	80
1966-	68	30

Almost one-third of the teachers of general mathematics have not taken course work in mathematics since 1960. The same ratio held true in the area of professional education for this same group of teachers.

Year	Professional Education	Mathematics
1930		2
1931-35		1
1936-40	4	4
1941-45	4	5
1946-50	4	14
1951-55	14	11
1956-60	21	11
1961-65	52	48
1966-	50	42

The proportion of seventh and eighth grade mathematics teachers who have not taken any mathematics since before 1961 was also about one-third. However, between 75 and 80 percent of these teachers reported taking professional course work since 1960. The results for this group of teachers were as follows:

Year	Professional Education	Mathematics
1930		3
1931-35		1
1936-40	5	7
1941-45	3	5
1946-50	14	31
1951-55	16	17
1956-60	30	32
1961-65	124	137
1966-	93	59

About one-fourth of the teachers of beginning algebra reported that they had not taken course work in mathematics since before 1960. The same ratio was also reported by the same teachers in the area of professionsl education. For teachers of first year algebra the results were:

Year	Professional Education	Mathematics
1930		3
1931-35		2
1936-40	4	6
1941-45	1	4
1946-50	1	4
1951-55	12	5
1956-60	24	13
1961-65	73	75
1966-	46	47

No second year algebra teachers reported taking their last course in professional education or mathematics prior to 1936 and only 1 teacher reported taking his last mathematics course between 1936 and 1940. The remaining results for the second year algebra teachers were:

Year	Professional Education	Mathematics
1946-50	1	3
1951055	7	2
1956-60	17	7
1961-65	50	60
1966-	30	33

There were 20 of 120 teaching positions in geometry filled by teachers who had not taken any mathematics after

1961. Approximately one-fifth of the geometry teachers had not taken any professional education courses since 1961.

Year	Professional Education	Mathematics
1931-35		1
1936-40	1	2
1941-45		
1946-50	3	3
1951-55	8	5
1956-60	12	9
1961-65	54	64
1966-	39	36

Two positions in advanced mathematics and trigonometry were filled by teachers who had taken their last course in mathematics between 1936 and 1940. All remaining positions in these areas were reported by teachers who had taken training in either education or mathematics after 1946. The responses:

Year	Professional Education	Mathematics
1946-50	3	3
1951-55	12	5
1956-60	18	14
1961-65	36	48
1966-	28	28

Objective XIV: To determine, by course title, an approximation of the training in mathematics of teachers as compared with the CUPM recommendations.

Each teacher was asked to indicate the mathematics courses which he or she had taken. A list of courses was prepared and included in the questionnaire which may be found in Appendix A. Provision was made to allow the teacher to write in additional courses. If a teacher failed to indicate a course, it was assumed that the teacher had not completed that course. Table I of Appendix K indicates the frequency which the courses were reported by the 964 respondents.

The Committee on the Undergraduate Program in Mathematics identifies the mathematics of grades one through six as level one. The programs for these teachers should contain a year of high school algebra and a year of high school geometry in addition to one college level course in geometry and one course in algebra. Also, the CUPM reccommended a two course sequence in the structure of the real numbers.

There were 95 positions reported in the first grade and 87 first grade teachers indicated that they had taken first year high school algebra. Only 65 teachers in the first grade reported taking either plane geometry or unified geometry in high school. There were 42 first grade teachers who reported taking college algebra and only 5 of these teachers had taken a college geometry course.

Of 81 possible second grade positions, there were 73 teachers who had taken high school algebra and 65 respondents had taken high school geometry. However, only 27 teachers in second grade positions had had college algebra and only 6 had been enrolled in geometry in college.

There were 90 third grade teachers of a possible 102 who had taken high school algebra and 69 had taken high school geometry. With regard to college algebra and geometry, there were 35 teachers who had had algebra and only 3 teachers indicated college geometry.

There were 56 fourth grade teachers who reported that they had taken high school geometry and 78 teachers in the fourth grade had taken high school algebra. There wer 88 positions reported in the fourth grade. At the college level, the fourth grade teachers indicated that 7 had taken geometry and 39 had taken algebra.

Only 1 fifth grade teacher and 2 sixth grade teachers reported taking college geometry and 45 fifth grade teachers and 50 sixth grade teachers had taken college algebra. Of the fifth grade teachers, 76 reported that they had taken high school algebra and 54 reported plane geometry. There were 82 sixth grade teachers who reported high school algebra and 70 fo the sixth grade teachers had taken plane geometry. A total of 88 positions were reported in the fifth grade and 102 positions were reported in the sixth grade.

Table II of Appendix K gives the frequency of mathematics courses teachers in grades 1-6 reported.

Teachers of seventh and eighth grade mathematics, high school general mathematics, beginning algebra, and geometry are included in level two by the CUPM. These teachers should have completed three years of high school, three courses in analysis or calculus, a course in abstract algebra, a course in probability, and one elective.

Table III of Appendix K indicates the responses of all teachers of level two subjects. There were 142 seventh grade positions, 166 eighth grade positions, 144 general mathematics positions, 167 beginning algebra positions and 121 geometry positions.

Only 28 seventh grade teachers and 45 eighth grade teachers indicated that they had completed a three course calculus sequence. Less than one-half, 74 of 167, algebra teachers had completed three calculus courses and 54 of 144 general mathematics teachers had completed calculus.

There were 14 seventh grade teachers who indicated completion of an abstract algebra course although 44 seventh grade teachers had taken a course in modern algebra which one could consider as perhaps fulfilling the CUPM recommendations. The corresponding results for eighth grade mathematics teachers were 21 and 55 respectively. There were 33 general mathematics teachers and 56 algebra teachers who had taken one course in abstract algebra. Again considering a course entitled modern algebra as fulfilling the algebra recommendation; 72 general mathematics teachers and 97 algebra teachers had completed such a course.

Considering a course in probability or statistics as fulfilling the probability recommendation, 52 seventh grade, 78 eighth grade, 85 general mathematics and 103 algebra teachers reported taking one or both of the courses. With regard to college geometry, 40 seventh grade, 56 eighth grade, 59 general mathematics, and 85 algebra teachers indicated that they have completed such a course.

Teachers of geometry indicated that 51 of 121 positions were filled by teachers who had completed three courses in calculus. Of these 121 positions, 73 teachers had completed college geometry. The geometry teachers also indicated that 71 positions were filled with personnel who had completed a modern algebra course and 43 teachers had completed abstract algebra. It is worthwhile to note that only 35 geometry teachers reported completion of non-Euclidean geometry and only 10 geometry teachers had taken projective geometry.

The second year algebra and trigonometry and advanced mathematics are in level three according to the CUPM definition. A teacher of any of these courses should have completed three courses in analysis, two courses in abstract algebra, two courses in geometry, two courses in probability and statistics and two upper level electives.

Of 107 second year algebra teachers 55 had completed a three course calculus sequence. However, only 16 teachers had taken two courses in abstract algebra. With regard to geometry, 52 second year algebra teachers had taken college geometry and 29 of these teachers had taken non-Euclidean geometry. Only 21 second year algebra teachers had completed a course in probability although 51 teachers reported completing a course in statistics.

There were 102 positions reported in trigonometry and advanced mathematics. Teachers in 26 of these positions had completed two courses in abstract algebra and teachers in 57 positions had completed three courses in calculus. With regard to probability and statistics, teachers in 41 positions had completed statistics and teachers in 41 positions had taken probability theory. Teachers in 60 advanced mathematics positions had taken college geometry and teachers in 34 positions had completed non-Euclidean geometry. Only 11 teachers of advanced mathematics reported that they had taken projective geometry.

DISCUSSION

At least two sources of error exist in the sampling procedure. First, in a number of cases judgement had to be exercised in determining if a teacher was an elementary or a secondary teachers since the grade level to which the teacher was assigned was not always indicated by the local school system. Furthermore, some school systems failed to indicate the subject areas of secondary teachers.

A second bias may exist in that it is probable that the better trained, more porfessional teachers would reply to such questionnaire. This could tend to give results which reflect the situation as being better than is actually the case.

With regard to the preceding errors or bias, the sample size as related to both the elementary and secondary levels should tend to minimize the sampling error. No adjustment was made for the possible bias as related to teacher responses. The number of returned usable responses would have a dampening effect on both errors.

The excessive number of school grade organizations reported in Alabama could present adjustment problems for students who move from one system to another. In systems where a number of school organizational plans are used, continuity of a mathematics program would be essential.

The number of schools reported with less than 100 students was relatively small. However when the grade organization of the school is considered, it is apparent that many school are not in a position to offer the depth and breadth in mathematics needed today. Of the schools organized on a 1-12 basis, 49 have enrollments of 400 or less and an average enrollment of less than 35 students per grade level. A similar problem likely exists for the 22 schools on the 1-8 plan with less than 400 enrollment.

Approximately one-fourth of the questionnaires returned were returned by men. About 10 percent of the men held elementary or elementary-secondary certificates. As expected about half of the women reported elementary certification.

Alabama does not recognize work beyond the fifth year on the state salary scale. Therefore, it was not surprising that only about 5 percent of the men and 3 percent of the women reported the six-year classification. By contrast, the Class A certificate indicates completion of one year of graduate study and it is recognized by the state for salary purposes. Nearly a third of the men and a fourth of the women reported the Class A certificate. Proportionally, the men held more advanced certificates than did the women. It may be assumed that the motivation is at least pratially financially motivated.

About one man in ten held some form of an Emergency Certificate, yet less than half as many women proportionately held an Emergency Certificate. This may be partially explained by a common practice in this region, i.e. supplementing mathematics teachers salaries. No other explanation is known to the investigator.

The ratio of men to women teaching secondary mathematics was determined by the use of positions. It was assumed that the ratio of the sexes with regard to the positions would be equivalent to the ratio between the sexes.

There was some error reported in the section pertaining to certification. Some teachers may not have known the type of their certificate. Some teachers who had not completed college indicated a certificate which represented a college degree. This type of error was assumed to be minimal.

As stated earlier, the State of Alabama does not supplement the salary of a teacher who has an "AA" certificate beyond the class "A" level. The differential in salary between the Class B certificate and the Class A certificate is not large for most systems. This may not account for the relatively small percnetage of teachers holding the Class A certificate. Furthermore, it is not a common practice of schools systems to require teachers to return periodically for additional training.

Some schools in Alabama have departmentalized in mathematics through grade four. This may account for a portion of the secondary certificates reported in the elementary grades.

In Alabama, teachers who possess an elementary certificate are certified to teach in grades seven and eight. This undoubtedly accounts for the large number of elementary certificates reported for those grade levels. The investigator believes that this practice is undesirable, particularly, as it affects mathematics programs. Furthermore the fact that over 10 percent of these positions were reported by teachers with an emergency certificates is not desirable.

It would appear that it is a common practice to employ teachers who do not have a secondary certificate for the expressed purpose of teaching secondary mathematics. A significant number of these non-secondary certificated teachers have emergency certificates.

The discrepancy between the percentage of first year teachers and the percentage of teachers who were new to the school indicates that the Alabama teachers move frequently from school to school. One reason for this is the practice of adjacent systems recruiting from each other.

The discrepancy between the median length of experience of men as compared to the corresponding median for women may be paritally due to the large number of men, particularly mathematics teachers, who leave education for higher salaried positions in industry. It is also the investigator's opinion that more men have entered the teaching profession in the last few years.

There is no reason available to this writer which justifies the variability in experience with respect to the elementary grades.

In the secondary grades, it appears that many teachers who change schools are assigned to teach general mathematics or mathematics in the junior high school; mathematics grade seven, mathematics grade eight, and beginning algebra. The number of men holding these positions tends to support the previous statement that more men are entering the teaching profession. Furthermore, it appears that many teachers prefer to change schools after teaching at this level. Perhaps one reason for this change is the desire on the part of the teacher to teach more advanced mathematics. Because of tradition, many teachers do not feel that general mathematics or seventh and eighth grade mathematics is "real mathematics". Another possible explanation for the high turnover in grades seven and eight may be that some administrators are trying to replace those teachers who are less well qualified with more qualified teachers as these become available. A shortage of mathematics teacher certainly contributes to this problem. Another contributing factor to the shortage of teachers is the low salaries throughout the state.

The shortage of teachers also probably contributes to the relatively high percentage of teachers teaching more more advanced work in the high schools with less than seven or eight years of experience. However, teachers of second year algebra, trigonometry, geometry, and advanced mathematics tend to be moving less frequently and have more experience.

If one assumes that a major in mathematics is necessary to teach mathematics and that this is particularly true as the mathematics becomes more advanced, it would appear that administrators try to assign the more qualified teachers to the more advanced courses. However, this investigator views with alarm the fact that nearly 30 percent of the second year algebra, geometry, and advanced mathematics teachers did not have a major in mathematics and almost one-half of the general mathematics teachers and over two-thirds of the junior high school mathematics teachers did not have a mathematics major.

The intent of the investigator was to attempt to determine the number of teachers who had attended a summer institute sponsored by the National Science Foundation. Of the 102 teachers who reported attending a N.S.F. Institute in Alabama, only the 25 teachers who had attended Auburn University, a portion of those teachers attending the University of Alabama, and teachers attending some colleges offering multi-area institutes could have attended such an institute in Alabama. Furthermore, some of the out-of-state colleges are known not to have offered N.S.F. summer institute in mathematics. It is probable that about 100 of the mathematics teachers who responded have attended such an institute.

It would appear that solid geometry as a high school course has essentially disappeared in Alabama. Trigonometry was not reported as a separate course as frequently as the investigator had expected. Whether or not these courses are being removed from the curriculum through revision in the curriculum or because of the scarcity of such texts would be an interesting question.

Some teachers still consider shop and business mathematics as part of the mathematics programs. Since there were relatively few of these positions reported, it may be assumed that the courses, particularly shop mathematics, are either not frequently taught or that the courses are no longer considered part of the mathematics program by the majority of teachers.

The distribution of class sizes indicates that some teachers, probably elementary teachers in departmentalized schools and secondary teachers, tended to round their "average class size" to multiples of five. Teachers of special education classes as well as secondary mathematics teachers with advanced classes in small rural schools would report small classes. The latter group were also likely to have very large classes of seventh and eighth grade mathematics. Therefore, the reported size of the more advanced classes is probably somewhat larger than is actually the case. The junior high classes reported are likely to be somewhat smaller than the true situation.

The Southern Association of Secondary Schools requires that the number of pupil contacts not exceed 150 per day. Many secondary schools have a five period school day and those teachers who are employed in schools accredited by the Southern Association would have an average class size of 30 pupils. It is apparent that many teachers of high school mathematics are not employed in schools which are accredited by the Southern Association. Relatively few junior high schools and elementary schools could be so accredited. Another factor in junior high school accreditation would be the number of teachers without a major or minor in mathematics who reported teaching mathematics. These are certainly not desirable situations.

Although many teachers indicated that they had either attended some institutes in mathematics or that they had taken part in in-service training programs in mathematics since 1960, the number of clock hours which these teachers reported leads this investigator to the conclusion of that most of these institutes could not have gone into sufficient depth to be of any significant benefit to the teacher. However the local school districts and all other cooperating groups are to be commended for what hasbeen done.

Some error exists with regard to the percentage of teachers with a major in mathematics who teach courses other than mathematics. Some few such teachers would teach more than one area other than mathematics. Therefore, the 23.4 per cent may be somewhat above the actual situation. Due to the small number of teachers with a major in mathematics, this practice should be eliminated.

Of the 247 teachers with a baccalaureate degree who reported that they were working toward an advanced degree, about one-third had less than 11 hours toward the advanced degree. Also since 24 teachers did not indicate the number of hours which they had completed beyond the baccalaureate, some of these 247 teachers may be indicating intention rather than actual work towards a degree. Also the large number of hours beyond the master's degree probably was computed from a baccalarueate degree rather than from the master's degree.

The small number of elementary positions which were reported as being filled by personnel with out advanced training can be explained in terms of the low salary differential between the Class A and Class b certificates. Also most of the elementary teachers are female.

As the level of the mathematics becomes more advanced, the percentage of teachers with advanced degrees increased with the notable exception of second year algebra teachers. No rational is offered for this discrepancy.

The proportion of elementary teachers who have not taken a professional education course since 1960 was both surprising and alarming. The results with regard to recency of courses in mathematics for elementary teachers was expected.

When the number of elementary teachers and teachers with emergency certificates who reported teaching secondary mathematics is considered, it is not surprising that about one-third of the teachers of seventh and eighth grade mathematics teachers have not taken any mathematics since 1961. The number of teachers who were relatively new to the profession may account for the higher per cent of teachers who have taken professional education courses.

As the level of mathematics courses increases, the more recent the training of teachers in both mathematics and professional education. One reason for this may be the number of these teachers who have taken advantage of summer institutes or Saturday programs which were sponsored.

With regard to the mathematics courses which the teachers indicated that they have taken, it is very possible that some teachers did not indicate all the courses which they had taken. This partially accounts for the large number of teachers who failed to indicate that they had taken any mathematics courses. However, some respondents indicated that they had not had any mathematics, including high school mathematics. Furthermore, some confusion would exist over identifying course by title.

If the assumption is made that those teachers who reported the smallest percentage of a CUPM recommended course had completed all other recommended courses, a maximum percentage of those teachers who meet the CUPM recommendations could be made. For the elementary grades, no more than 10 per cent of the teachers could satisfy the recommendations.

Because of the number of teachers at the secondary level who have taken graduate study in mathematics, the number of teachers fulfilling the level two recommendations would be significantly higher. A maximum of about 25 percent of the teachers of seventh and eighth grade mathematics could satisfy the level two recommendations and about 25 percent of the advanced mathematics teachers could satisfy the level three recommendations. Because of the original assumption, the preceding percents are excessive of the actual situation.

CONCLUSIONS AND IMPLICATIONS

Objective I

In grades 7-12, 48.3 percent of the positions held were reported by men and 45.9 percent were reported by women. The teachers in the remaining positions failed to indicate their sex. For all practical purposes, it may be assumed that the positions in secondary mathematics are evenly divided between the sexes.

Because of the number of men teaching secondary mathematics and the low salary scale in Alabama, any retraining program will likely need to ease the financial burden of these men who are probably head of a household. A program similar to the National Science Foundation is needed to train or re-train the mathematics teachers.

Objective II

The percentage of teachers who reported the six-year certificate was small, 3.4 percent, and only 26.9 percent of the teachers indicated a five-year certificate. If Alabama teachers are expected to work towards these advanced certificates, a greater salary differential must exist between the various certificates.

The percentage of emergency certificates reported, 7.5 percent, is undesirable. Again, this partially reflects the low salary scale. Similarly, the percentage of teachers of secondary mathematics who were improperly certified reflects the low salary schale and general scarcity of mathematics teachers. Salaries need to be raised to attract more qualified teachers.

Objective III

A median of 9.4 years total experience was reported by all teachers and approximately 7.8 percent of all respondents were first year teachers. However, the median length of service to the current school was only 3.4 years with over 20 percent of the teachers new to their current school. Female teachers have generally taught longer and have been employed by their current school longer.

The preceding data implies an unstable school situation. Also men are either just entering the profession or the profession is not retaining male teachers. Again an increase in salaries would tend to alleviate the situation.

Objective IV

The percentage of positions in secondary mathematics held by teachers reporting a major in mathematics was 53.7 percent. Again salaries are seen as a major factor.

Objective V

The predominant minors of mathematics majors reported were English, social science, and science with areas of science mentioned most frequently.

The majority of teachers with minors in mathematics reported majors in science and social science. As a result of the information, attention will be given to those students in the area of social science education who may plan to minor in mathematics.

Objective VI

A maximum of 39.8 percent of the secondary mathematics positions were filled by teachers who reported that they had attended a National Science Foundation Institute. Because of reasons stated in the discussion section of this paper, the percentage stated is probably excessive. Few teachers in grades seven and eight reported attending such an institute. A similar program for teachers with very weak backgrounds should be submitted for these personnel.

Objective VII

All of the teachers who reported attending N.S.F. Institutes attended since 1957. The number of teachers attending these institutes has increased yearly.

Objective VIII

Of 155 teachers who reported attending a N.S.F. Institute, 124 have attended institutes in colleges located in the states of Alabama, Georgia, Louisiana, Mississippi, Tennessee, North Carolina, and South Carolina. Approximate half of the 124 teachers attended Alabama institutions.

Objective IX

All traditional high school courses were reported. Relatively few teachers reported solid geometry. There was a clear indication that some schools offer five or six years of mathematics starting with algebra in grade seven.

Objective X

Teachers were asked to indicate their "average" class size. The medians of the average class sizes reported were: (1) 32 pupils in grades 1-3, (2) 32 pupils in grades 1-6, (3) 30 pupils in seventh and eighth grade mathematics and general mathematics, (4) 25 pupils in geometry and advanced mathematics, (5) 28 pupils in beginning algebra, and (6) 26 pupils in second year algebra.

Since these figures represent median of medians, it is apparent that many classes in junior high school mathematics are too large. These classes should be reduced in size.

Objective XI

The use of in-service training programs in mathematics for re-training teachers has been extensive since 1959. However, approximately 80 percent of these programs have lasted 36 clock hours or less. The length of these programs needs to be extended to permit more work in depth.

Objective XII

A maximum of 23.4 percent of those teachers reporting a major in mathematics teach outside the area of mathematics The use of these teachers in areas other than mathematics should be discontinued.

Objective XIII

There were 25 of 964 who responded who had not completed a baccalaureate. There were 703 teachers with a baccalaureate, 232 master's degrees, and 4 teachers with the Specialist in Education. A total of 291 teachers indicated that they were working towards a higher degree.

About 80 percent of the elementary positions and seventh and eighth grade positions were filled by personnel with baccalaureate degrees. With the exception of the second year algebra teachers who reported that 74.8 percent of the Algebra II teachers had a four-year degree, the teachers of the more advanced classes reported a higher percentage of advanced degrees.

About one-third of the teachers in grades 1-8 reported that they had not had a professional education course in the last six years. Over half the primary teachers and a third of the teachers in grades 4-8 have not had a mathematics course in at least six years. Approximately one-fourth of the teachers of beginning algebra have not taken a professional education course in six years and the same ratio was true for the same period of time with regard to mathematics. Teachers of courses beyond beginning algebra reported more recent training in both mathematics and professional education with only minor exceptions.

A re-training program particularly designed for upper elementary and junior high school teachers is needed.

Objective XIV

Less than 10 percent of the elementary teachers in Alabama can meet the recommendations for level one set forth by the Committee on the Undergraduate Program in Mathematics. Not more than one-fourth of the personnel in level three indicated that their training would satisfy the CUPM's recommendations. The same percentage is true for the teachers of seventh and eighth grade mathematics with regard to level two recommendations.

Programs such as the National Science Foundation are needed to train and re-train additional teachers. The poor background in mathematics of many junior high school teachers would prohibit these teachers from taking mathematics courses for graduate credit in mathematics. A re-training program for these teachers is necessary.

SUMMARY

It was the purpose of this study to determine factual information about the mathematics teachers of Alabama. Specific objectives included the following:

1. To determine the ratio of males to females teaching secondary mathematics in Alabama.
2. To determine the certification status of Alabama teachers of mathematics.
3. To determine the amount of teaching experience of Alabama teachers of mathematics.
4. To determine the ratio of teachers of secondary mathematics without a college major in mathematics to the number of secondary mathematics teachers.
5. To determine the major-minor combinations of secondary mathematics teachers.
6. To determine the approximate proportion of mathematics teachers who have taken advantage of the National Science Foundation Institutes.
7. To determine the recency of training of former/current members of N.S.F. Institutes.
8. To determine the colleges offering N.S.F. Institutes which Alabama teachers have attended.
9. To determine the mathematics courses currently being offered in Alabama public schools.
10. To determine the size of mathematics classes in Alabama's elementary and secondary schools.
11. To determine the extent and recency of in-service training programs in mathematics of Alabama public schools.
12. To determine the proportion of trained mathematics teachers teaching in areas other than mathematics.
13. To determine the academic preparation of Alabama mathematics teachers.
14. To determine, by course title, an approximation of the training in mathematics of teachers as compared with CUPM recommendations.

A questionnaire was mailed to 1000 secondary mathematics teachers and 2018 elementary teachers. The method of selecting teachers was a stratified random sample using the ratio of members in the sample to the total population times the potential population within a system. Teachers within a system to be sampled were selected by use of random numbers. There were 964 usable questionnaires returned. The findings were as follows:

1. The ratio of males to females teaching secondary mathematics was nearly 1:1.

2. Of 956 responses, the following certificates and the approximate percent of teachers reporting said certificates were:

    a. Emergency and certificates no longer issued - 7.5 percent.

    b. Four-year or Class B - 62.5 percent

    c. Five-year or Class A - 26.9 percent

    d. Six-year or Class AA - 3.4 percent

3. The median amount of total experience reported was 9.4 years with 7.8 percent first year teachers. The median length of service to the current school was 3.4 years and over 20 percent of the teachers were new to their current school.

4. Excluding business and shop mathematics, 46.3 percent of the positions in secondary mathematics were filled by teachers who did not have a college major in mathematics.

5. The most prevalent minors of mathematics major were reported to be science, English and social science. These three areas were also the most common majors of teachers with a mathematics minor.

6. A maximum of 39.8 percent of the secondary mathematics teachers have attended a National Science Foundation program.

7. Of 155 teachers who reported attending a N.S.F. program, 144 teachers have attended since 1960.

8. Of 155 teachers who reported attending a N.S.F. program, 124 have attended colleges in Alabama, Georgia, Louisiana, Mississippi, Tennessee, North Carolina, and South Carolina.

9. All traditional mathematics courses were reported at the secondary level. Some teachers reported seventh and eighth grade algebra classes.

10. The medians of the "average" size of mathematics classes reported varied from 25 students in advanced mathematics classes to 35 students in elementary school classes.

11. Since 1959, many Alabama schools have used in-service training programs in mathematics; however, these programs have been too short in the number of clock hours to allow any reasonable depth of study in mathematics.

12. A maximum of 23.4 percent of the teachers with a major in mathematics teach courses other than mathematics.

13. There were 25 teachers who had not completed a college degree, 703 completed a baccalaureate degree, 232 completed a master's degree, and 4 specialists.

14. Less than 10 percent of the elementary teachers reported courses equivalent to the level one CUPM recommendations and less than 25 percent of the junior high school teachers meet the level two recommendations. A maximum of 25 percent of the high school teachers indicated courses equivalent to the level three recommendations.

The need for re-training porgrams for upper elementary and junior high school teachers is clear. This program must be based upon the assumption of minimal mathematics training. Programs in operation which are currently being used for re-training teachers should be continued. Salaries of teachers in this state need to be raised to attract and hold competent mathematics teachers.

APPENDIX A

Mathematics Education

Dear Colleague:

The role of education in Alabama has never been of greater importance. As you well know, the quality of our public schools today will determine the destiny of our state and our nation tomorrow.

We are interested in determining the present level of mathematics education in our state and we would like to solicit your assistance in completing this questionnaire. Obviously, the information which you give will be confidential. If you are uncertain about any response, use your own best judgment.

Would you please fill out this questionnaire and return to me at your earliest possible convenience. A self-addressed, stamped envelope is enclosed.

Sincerely yours,

Ken Easterday

Kenneth E. Easterday
Project Director
Assistant Professor of
Secondary Education

KEE:vb

1. ☐ Male
2. ☐ Female

1. ☐ Single
2. ☐ Married
3. ☐ Widowed

1. Check the grade organization of your school:

01. ☐ 1-3
02. ☐ 1-4
03. ☐ 1-5
04. ☐ 1-6
05. ☐ 1-7
06. ☐ 1-8
07. ☐ 1-9
08. ☐ 1-12
09. ☐ 4-7
10. ☐ 5-6
11. ☐ 5-7
12. ☐ 5-8
13. ☐ 6-8
14. ☐ 6-9
15. ☐ 6-10
16. ☐ 6-12
17. ☐ 7-8
18. ☐ 7-9
19. ☐ 7-12
20. ☐ 8-12
21. ☐ 9-12
22. ☐ 10-12
23. ☐ 11-12

2. Check the number of pupils enrolled in your school:

1. ☐ 0-50
2. ☐ 51-100
3. ☐ 101-200
4. ☐ 201-400
5. ☐ 401-800
6. ☐ 801-1200
7. ☐ 1201-1600
8. ☐ 1601-2000
9. ☐ 2001 or more

3. Check your certification status:

01. ☐ Emergency
02. ☐ Class B Elementary
03. ☐ Class B Secondary
04. ☐ Class B Elementary-Secondary
05. ☐ Class A Elementary
06. ☐ Class A Secondary
07. ☐ Class A Elementary-Secondary
08. ☐ Class AA Elementary
09. ☐ Class AA Secondary
10. ☐ Class AA Elementary-Secondary
11. ☐ Other, Specify ____________________

4. How many years have you taught in this school prior to 1966-67? ____________

5. What is your total number of years of teaching experience prior to 1966-67? ____________

(Semester hours x 3/2)

6. If you are not a college graduate, how many quarter hours do you have?_______

7. If you are a college graduate, in what year did you receive your baccalaureate degree? ____________

8. Check your undergraduate major(s):

01. ☐ Agriculture
02. ☐ Art
03. ☐ Biological Science
04. ☐ Business Education
05. ☐ Dramatic Arts
06. ☐ Elementary
07. ☐ English
08. ☐ Foreign Language
09. ☐ Home Economics
10. ☐ Industrial Arts
11. ☐ Math
12. ☐ Music
13. ☐ Physical Education
14. ☐ Physical Science
15. ☐ Psychology
16. ☐ Social Studies
17. ☐ Special Education
18. ☐ Speech
19. ☐ Other, Specify____________________

9. Check your undergraduate minor(s):

01. ☐ Agriculture
02. ☐ Art
03. ☐ Biological Science
04. ☐ Business Education
05. ☐ Dramatic Arts
06. ☐ Elementary
07. ☐ English
08. ☐ Foreign Language
09. ☐ Home Economics
10. ☐ Industrial Arts
11. ☐ Math
12. ☐ Music
13. ☐ Physical Education
14. ☐ Physical Science
15. ☐ Psychology
16. ☐ Social Studies
17. ☐ Special Education
18. ☐ Speech
19. ☐ Other, Specify ______________________________

10. Check your highest degree:

1. ☐ B.S.
2. ☐ B.A.
3. ☐ M.S.
4. ☐ M.A.
5. ☐ M.Ed.
6. ☐ M.A.T.
7. ☐ Sp. Ed.
8. ☐ Ph.D.
9. ☐ Ed.D.

11. Are you working on an advanced degree?

1. ☐ Yes 2. ☐ No

(Semester hours x 3/2)

12. If your answer to 11. is yes, how many quarter hours do you have beyond the degree checked in number 10? ______________

13. In what year did you receive the degree checked in 10? ______________

14. In what year did you complete your last course in professional education? ______________

15. In what year did you complete your last course in mathematics? __________

16. Have you attended an NSF Institute in Mathematics? 1. ☐ Yes 2. ☐ No

17. If your answer to 16 is yes, what year did you last attend an NSF Institute? ______________

18. If your answer to 16 is yes, at what school? ______________________

19. Have you attended an institute in mathematics other than an NSF Institute? 1. ☐ Yes 2. ☐ No.

20. If your answer to 19 is yes, what year? ______________

21. If you have attended an in-service training program in mathematics, check the number of clock hours of the program.

1. ☐ 1-12 2. ☐ 13-26 3. ☐ 27-54 4. ☐ 55 or more

22. If you have attended an in-service training program in mathematics, indicate the sponsor:

1. ☐ Local School System
2. ☐ State Department
3. ☐ College
4. ☐ Other, Specify ______________

23. In what year was the most recent in-service training program in mathematics which you attended? ________________

24. Check the mathematics courses which you will teach during the year 1966-67:

01. ☐ Grade 1
02. ☐ Grade 2
03. ☐ Grade 3
04. ☐ Grade 4
05. ☐ Grade 5
06. ☐ Grade 6
07. ☐ Grade 7
08. ☐ Grade 8
09. ☐ General Math 9
10. ☐ General Math
11. ☐ General Math 12
12. ☐ Algebra Grade 7
13. ☐ Algebra Grade 8
14. ☐ Algebra Grade 9
15. ☐ Algebra II
16. ☐ Plane Geometry
17. ☐ Solid Geometry
18. ☐ Unified Geometry
19. ☐ Trigonometry
20. ☐ Advanced Math 11
21. ☐ Advanced Math 12
22. ☐ Other, Specify ________________________

25. If your school is departmentalized, do you now teach courses other than mathematics? 1. ☐ Yes 2. ☐ No

26. If your answer to 25 is yes, check the areas other than mathematics which you now teach:

01. ☐ Agriculture
02. ☐ Biological Science
03. ☐ Business Education
04. ☐ Drama
05. ☐ English
06. ☐ Foreign Language
07. ☐ Home Economics
08. ☐ Industrial Arts
09. ☐ Music
10. ☐ Physical Education
11. ☐ Physical Science
12. ☐ Reading
13. ☐ Social Studies
14. ☐ Special Education
15. ☐ Other, Specify ____________________

27. What is your average class size? ______________________

28. How many different subject preparations do you have now? ________________

29. Check the courses which you have taken:

☐ High School Algebra
☐ Plane Geometry
☐ Trigonometry
☐ Advanced Math Grade 11
☐ College Algebra 1st Term
☐ Modern Algebra
☐ Analytic Geometry
☐ Calculus II
☐ Calculus IV
☐ Probability
☐ Abstract Algebra II
☐ Statistics
☐ Differential Equations
☐ Projective Geometry
☐ Intermediate Algebra
☐ Solid Geometry
☐ Unified Geometry
☐ Advanced Math Grade 12
☐ College Algebra 2nd Term
☐ College Geometry
☐ Calculus I
☐ Calculus III
☐ Non-Euclidean Geometry
☐ Abstract Algebra I
☐ Topology
☐ Finite Math
☐ Analysis
☐ Other, Specify ________________

APPENDIX B

TABLE I

GRADE ORGANIZATION	Frequency	Percent
1-3	9	.9
1-4	11	1.3
1-5	13	1.4
1-6	275	28.9
1-7	20	2.1
1-8	64	6.7
1-9	77	8.1
1-12	229	24.1
4-7	1	.1
5-6	2	.2
5-7	1	.1
5-8	3	.3
6-8	4	.4
6-9	2	.2
6-10		
6-12	8	.8
7-8	8	.8
7-9	51	5.4
7-12	79	8.3
8-12	11	1.2
9-12	39	4.1
10-12	38	4.0
11-12	1	.1
4-8	5	.5
TOTAL	951	100.0

TABLE II

ENROLLMENT	Frequency	Percent
0-50	3	.3
51-100	19	2.0
101-200	48	5.1
201-400	189	20.1
401-800	391	41.5
801-1200	172	18.3
1201-1600	71	7.5
1601-2000	24	2.5
2001 or more	25	2.7
TOTAL	942	100.00

TABLE III

Student Enrollment

GRADE ORGANIZATION	0-50	51-100	101-200	201-400	401-800	801-1200	1201-1600	1601-2000	2000 +	Total
1-3				1	7		1			9
1-4				3	7					10
1-5			1	2	10					13
1-6	1	14	20	66	123	32	11	2	1	
1-7			3	9	6	2				20
1-8		2	6	14	19	15	2	3		61
1-9		2	12	22	22	7	6		2	73
1-12	1		6	42	86	53	20	7	8	223
4-7						1				1
5-6				1	1					2
5-7				1						1
5-8				3						3
6-8				1	2	1				4
6-9					1	1				2
6-10										
6-12				3	3	1	1			8
7-8				5	1					6
7-9				3	11	27	8			49
7-12				14	37	9	11	3	4	78
8-12				1	8			2		11
9-12				2	19	15	2		1	39
10-12				2	9	4	7	7	9	38
11-12										
4-8					4	1				5
TOTAL	2	18	48	195	376	169	69	24	25	926

TABLE IV

*

Certificate	No. Response	Percent	Male	Percent	Female	Percent	Total	Percent
No Response	1	1.5	3	1.3	15	2.3	19	2.0
Emergency	4	5.9	23	10.0	30	4.4	57	5.9
Class B Elementary	23	33.8	10	4.3	254	38.0	287	29.8
Class B Secondary	10	14.7	98	42.8	158	23.6	266	27.6
Class B Elementary-Secondary	2	2.9	7	3.0	27	4.1	36	3.7
Class A Elementary	10	14.6	1	.4	82	12.2	93	9.7
Class A Secondary	9	13.2	68	29.6	61	9.2	138	14.2
Class A Elementary-Secondary	5	7.4	3	1.3	10	1.5	18	1.9
Class AA Elementary	1	1.5	1	.4	9	1.4	11	1.1
Class AA Secondary			8	3.5	7	1.1	15	1.6
Class AA Elementary-Secondary	1	1.5	2	.9	2	.3	5	.5
Rank III			1	.4	3	.5	4	.4
Defense	2	3.0	1	.4	5	.8	8	.8
Special Education					1	.2	1	.1
Administration			4	1.7			4	.4
Rank II					1	.2	1	.1
Guidance					1	.2	1	.1
TOTAL	68	100.0	230	100.0	666	100.0	964	100.0

TABLE V

Grade Level	Male	Percent	Female	Percent	No Response	Percent	Total
Grades 1-3	1	.4	255	92.4	20	7.2	276
Grades 4-6	28	10.1	224	80.9	25	9.0	277
Grades 1-6	29	5.2	479	86.7	45	8.1	553
Special Education	0	.0	6	100.0	0	.0	6
Grades 7-8	146	47.4	144	46.8	18	5.8	308
General Math[a]	85	52.5	63	38.9	14	8.6	162
Algebra I	81	48.8	75	45.2	10	6.0	166
Junior High[b]	312	49.1	282	44.3	42	6.6	636
Algebra II	44	41.1	56	52.3	7	6.6	107
Geometry	64	52.9	53	43.8	4	3.3	121
Advanced Math[c]	46	45.5	52	51.5	3	3.0	101
High School[d]	154	46.8	161	48.9	14	4.3	329

[a] General mathematics includes math. 9, general mathematics, shop mathematics, and business mathematics.

[b] Grades 7 and 8, general mathematics, and Algebra I.

[c] Trigonometry, advanced mathematics Grade 11 mathematics Grade 12.

[d] Algebra II, Geometry, and advanced mathematics.

APPENDIX C

C

TABLE I

Certificate	Grades 1-3	Percent*	Grades 4-6	Percent	Grades 1-6	Percent	Special Education
No Response	5		6		11		
Class B Elementary	156	57.6	130	47.8	286	52.7	3
Class A Elementary	51	18.8	45	16.5	96	17.7	
Class AA Elementary	8	3.0	4	1.5	12	2.2	1
All Elementary	215	79.3	179	65.8	394	72.6	
Class B Ele.-Sec.	9	3.3	17	6.2	26	4.8	
Class A Ele.-Sec.	3	1.1	7	2.6	10	1.8	
Class AA Ele.-Sec.	1	.4	1	.4	2	.4	
All Elementary-Secondary	13	4.8	25	9.2	38	7.0	
Emergency	7	2.6	14	5.1	21	3.9	
Rank III	1	.4	1	.4	2	.4	
Defense	3	1.1	1	.4	4	.7	
Rank II	0	.0	1	.4	1	.2	
All Emergency and Dated	11	4.1	17	6.3	28	5.2	
Class B Secondary	26	9.6	40	14.7	66	12.2	
Class A Secondary	5	1.8	10	3.7	15	2.8	
Class AA Secondary	1	.4	1	.4	2	.4	
All Secondary	32	11.8	51	18.7	83	15.3	
Special Education	0	.0	0	.0	0	.0	1
Guidance	0	.0	0	.0	0	.0	1
Administration	0	.0	0	.0	0	.0	—
TOTAL	276	100.0	278	100.0	554	100.0	6

*Percents determined from all responses indicating certificates.

TABLE II

Certificate	Math 7 and 8	Percent*	Algebra I	Percent	Gen. Math**	Percent
No Response	4		1		3	
Class B Elementary	23	7.6	2	1.2	6	3.9
Class A Elementary	3	1.0	0	.0	0	.0
Class AA Elementary	2	.7	0	.0	0	.0
All Elementary	28	9.2	2	1.2	6	3.9
Class B Ele.-Sec.	12	3.9	4	2.4	2	1.3
Class A Ele.-Sec.	7	2.3	1	.6	5	3.2
Class AA Ele.-Sec.	4	1.3	2	1.2	1	.6
All Elementary-Secondary	23	7.6	7	4.2	8	5.1
Emergency	35	11.5	8	4.8	17	10.9
Rank III	2	.7	1	.6	0	.0
Defense	4	1.3	1	.6	1	.6
Administration	5	1.6	2	1.2	1	.6
Administration, Emergency, and Dated	46	15.1	12	7.3	19	12.2
Class B Secondary	132	43.4	78	47.3	73	46.8
Class A Secondary	70	23.0	61	37.0	47	30.1
Class AA Secondary	5	1.6	5	3.0	3	1.9
All Secondary	207	68.1	144	87.3	123	78.8
TOTAL	308	100.0	166	100.0	159	100.0

* General mathematics includes all general mathematics above the eighth grade, business mathematics, and shop mathematics.

**Percents determined from responses indicating certificates

TABLE III

Certificate	Algebra II	Percent[d]	Geometry[a]	Percent	Adv. Math.[b]	Percent	High School[c]	Percent
No Response	1		3		0		4	
Class B Elementary	1	.9	0	.0	0	.0	1	.3
Class A Elementary	0	.0	0	.0	0	.0	0	.0
Class AA Elementary	0	.0	0	.0	0	.0	0	.0
All Elementary	1	.9	0	.0	0	.0	1	.3
Class B Ele.-Sec.	1	.9	0	.0	0	.0	1	.3
Class A Ele.-Sec.	3	2.8	1	.8	5	5.0	9	2.8
Class AA Ele.-Sec.	1	.9	0	.0	0	.0	1	.3
All Ele.-Sec.	5	4.7	1	.8	5	5.0	11	3.4
Emergency	7	6.6	10	8.5	9	9.0	26	8.0
Rank III	1	.9	2	1.7	1	1.0	4	1.2
Defense	1	.9	1	.8	3	3.0	5	1.5
Administration	0	.0	0	.0	0	.0	0	.0
Emerg., Dated, and Ad.	9	8.5	13	11.0	13	13.0	35	10.8
Class B Secondary	47	44.3	65	55.1	43	43.0	155	48.1
Class A Secondary	36	34.0	33	28.0	31	31.0	100	30.9
Class AA Secondary	8	7.6	6	5.1	8	8.0	22	6.7
All Secondary	91	85.9	104	88.2	82	82.0	277	85.5
TOTAL	107	100.0	121	100.0	100	100.0	328	100.0

[a] Includes responses of solid, unified, and plane geometry

[b] Includes advanced mathematics in grades 11 and 12, plus trigonometry

[c] Includes Algebra II, geometry, and advanced mathematics

[d] Percents determined from all responses indicating certificates

APPENDIX D

TABLE I

SCHOOL EXPERIENCE IN YEARS	Men	Cumulative Percent	Women	Cumulative Percent	No Response	Cumulative Percent	Total	Cumulative Percent
0	55	23.9	137	20.6	10	14.7	202	21.0
1	33	38.3	80	32.7	10	29.4	123	33.8
2	28	50.4	63	42.2	6	38.2	97	43.9
3	15	57.0	44	48.8	4	44.1	63	50.4
4	17	64.3	30	53.3	3	48.5	50	55.6
5	7	67.4	35	58.6	1	50.0	43	60.1
6	15	73.9	21	61.7	3	54.4	39	64.1
7	9	77.8	22	65.1	1	55.9	32	67.5
8	7	80.9	19	67.9	1	57.4	27	70.3
9	3	82.2	20	70.9	1	58.8	24	72.8
10	5	84.3	17	73.5	2	61.8	24	75.3
11	5	86.5	13	75.5	1	63.3	19	77.2
12	2	87.4	16	77.9	3	67.6	21	79.4
13	9	91.3	13	79.8	1	69.1	23	81.8
14			7	80.9	1	70.6	8	82.6
15			16	83.3	2	73.5	18	84.5
16	2	92.2	10	84.8			12	85.8
17	5	94.3	6	85.7	2	76.5	13	87.1
18			7	86.7	2	79.4	9	88.0
19	2	95.2	9	88.1	2	82.4	13	89.4
20	7	98.3	12	89.9	2	85.3	21	91.6
21	1	98.7	11	91.6			12	92.8
22			10	93.1	2	88.2	12	94.1
23			9	94.4			9	95.0
24	1	99.1	1	94.6			2	95.2
25			2	94.9			2	95.4
26			3	95.3	2	91.1	5	95.9
27	1	99.6	4	95.9	1	92.6	6	96.6
28	1	100.0	2	96.2	2	95.6	5	97.1
29			4	96.8			4	97.5
30			5	97.6			5	98.0
30+	—		16	100.0	3	100.0	19	100.0
Total	230		664		68		962	

TABLE II

TOTAL EXPERIENCE IN YEARS	Men	Cumulative Percent	Women	Cumulative Percent	No Response	Cumulative Percent	Total	Cumulative Percent
0	19	8.3	52	7.8	4	5.9	75	7.8
1	16	15.4	58	16.5	3	10.3	77	15.8
2	26	26.5	51	24.2	2	13.2	79	24.0
3	19	34.8	32	29.1	1	14.7	52	29.4
4	15	41.3	21	32.2	3	19.1	39	33.4
5	14	47.4	25	36.0			39	37.5
6	17	54.8	23	39.4	2	22.1	42	41.8
7	9	58.7	20	42.5	5	29.4	34	45.4
8	6	61.4	23	45.8			29	48.4
9	6	63.9	20	48.9	2	32.4	28	51.3
10	6	66.5	22	52.1	1	33.8	29	54.3
11	5	68.8	21	55.3			26	57.0
12	8	72.2	14	57.5	2	36.8	24	59.5
13	6	74.7	12	59.3	1	38.2	19	61.5
14	4	76.5	10	60.7	1	39.7	15	63.0
15	7	79.5	11	62.3	1	41.1	19	65.0
16	5	81.7	18	65.1	3	45.7	26	67.7
17	8	85.2	12	66.9		50.0	23	70.1
18	1	85.7	3	67.3			4	70.5
19	4	87.4	12	69.2	1	51.5	20	72.6
20	5	89.6	10	70.7	5	58.8	20	74.7
21	3	90.9	12	72.5			15	76.2
22	3	92.2	15	74.8	2	61.7	20	78.3
23	1	92.6	16	77.1			17	80.1
24			14	79.2	1	63.2	15	81.6
25			5	80.0	3	67.7	8	82.4
26	3	93.9	10	81.5	1	69.1	14	83.9
27	1	94.3	9	82.9	1	70.6	11	85.0
28	2	95.2	7	83.7	3	76.0	12	86.3
29	1	95.6	13	86.1	4	80.9	18	88.2
30	2	96.5	14	88.0	2	83.8	8	89.0
31-35	3	97.8	38	93.6	7	94.2	48	94.0
36-40	3	99.2	24	97.7	3	98.5	30	97.1
41+	2	100.0	15	100.0	1	100.0	18	100.0
TOTAL	230		665		68		963	

TABLE III

SCHOOL EXPERIENCE IN YEARS	Grade 1	Cumulative Percent	Grade 2	Cumulative Percent	Grade 3	Cumulative Percent	Primary	Cumulative Percent
0	19	20.4	25	31.3	16	15.7	60	21.8
1	9	30.1	6	38.8	13	28.4	28	31.9
2	8	38.8	7	47.5	10	38.2	25	41.0
3	6	45.1	4	52.5	7	45.0	17	47.2
4	6	51.7	1	53.7	6	51.0	13	51.9
5	6	57.0	5	60.0	5	55.9	16	57.7
6	3	60.2	1	61.3	5	60;7	9	61.0
7	1	61.4	1	62.5	2	62.7	4	62.4
8	4	65.5	2	65.0	1	63.6	7	65.0
9	2	67.8	4	70.0	4	67.6	10	68.6
10	2	70.0			7	74.5	9	71.9
11			1	71.3	1	75.4	2	72.6
12	3	73.1	3	75.0	5	80.2	11	76.6
13	3	76.4	1	76.3	3	83.1	7	79.1
14	1	77.5			2	85.2	3	80.2
15	3	80.7	4	81.3	2	87.1	9	83.5
16	1	81.8	1	82.5	2	89.1	4	84.9
17			1	83.7	1	90.1	2	85.7
18	2	83.9	1	85.0			3	86.8
19			1	86.2	2	92.0	3	87.8
20	1	85.0	3	90.0	2	94.0	6	90.0
21	2	87.1			1	95.0	3	91.1
22	3	90.4	2	92.5	1	96.0	6	93.3
23	2	92.5					2	94.0
24	1	94.6					1	94.4
25	1	95.8	1	93.8	1	97.0	3	95.5
26					2	99.0	2	96.2
27								
28			1	95.1			1	96.6
29	2	96.8	1	96.4			3	97.6
30	1	99.1	1	97.6	1	100.0	3	98.7
30+	1	100.0	2	100.0			3	100.0
TOTAL	93		80		102		275	
MEAN	7.8		7.6		6.9		7.4	

TABLE IV

TOTAL EXPERIENCE IN YEARS	Grade 1	Cumulative Percent	Grade 2	Cumulative Percent	Grade 3	Cumulative Percent	Primary	Cumulative Percent
0	8	8.4	12	14.8	8	7.9	28	10.1
1	8	16.8	8	24.7	5	12.9	21	17.7
2	3	20.0	3	28.4	9	21.8	15	23.1
3	3	23.1	3	32.1	2	27.8	8	26.0
4			1	33.3	8	31.7	9	29.2
5	2	25.2	3	37.0	3	34.7	8	32.1
6	3	28.4	4	42.0	2	36.6	9	35.4
7	4	32.6	4	46.9	3	39.6	11	39.3
8	4	36.8	2	49.4	2	41.6	8	42.2
9	3	40.0	4	54.3	4	45.5	11	46.2
10	3	43.1	2	56.8			5	48.0
11	1	44.2	4	61.7			5	49.8
12	1	45/2	1	62.9	4	49.5	6	52.0
13	1	46.2					1	52.3
14	1	47.3			2	51.2	3	53.4
15	3	50.5	1	64.2	1	52.5	5	55.2
16	2	52.6	1	65.4	2	54.5	5	57.0
17	2	54.7	1	66.6	3	57.4	6	59.2
18								
19	3	57.9	2	69.1	2	59.4	7	61.7
20	1	58.9	3	72.8			4	63.2
21	3	62.1			2	61.4	5	65.0
22	1	63.1	2	75.3	6	67.3	9	68.2
23	4	67.3	2	77.7	3	70.3	9	71.5
24	4	71.5	3	81.4	3	73.3	10	75.1
25	1	72.6	1	82.7	2	75.2	4	76.5
26	1	73.6	1	83.9	3	78.2	5	78.3
27	6	80.0	2	86.4	1	79.2	9	81.6
28	1	81.0			4	83.2	5	83.4
29	3	84.2	1	87.6	4	87.1	8	86.3
30	2	86.3			2	89.1	4	87.7
31-35	8	94.7	8	97.5	7	96.0	23	96.0
36-40	4	98.9	1	98.7	3	99.0	8	98.9
41+	1	100.0	1	100.0	1	100.0	3	100.0
TOTAL	95		81		101		277	
MEAN	16.1		12.4		13.8		14.6	

TABLE V

SCHOOL EXPERIENCE IN YEARS	Grade 4	Cumulative Percent	Grade 5	Cumulative Percent	Grade 6	Cumulative Percent	Inter-mediate	Cumulative Percent
0	14	16.1	13	14.9	22	21.8	49	17.8
1	8	25.3	13	29.9	7	28.7	28	28.0
2	8	34.5	11	42.5	12	40.6	31	39.2
3	7	42.5	6	49.4	6	46.5	19	46.1
4	3	46.0	4	54.0	5	51.5	12	50.5
5	2	48.3	2	56.3	1	52.5	5	52.3
6	5	54.0	2	58.6	3	55.4	10	55.9
7	2	56.3	3	62.0	4	59.4	9	59.2
8	1	57.5	3	65.5	5	64.4	9	62.4
9	3	60.9	2	67.8	1	65.3	6	64.6
10	5	66.6	3	71.2	3	68.3	11	68.6
11	4	71.2	3	74.7	4	72.3	11	72.6
12	4	75.8	4	79.3	2	74.2	10	76.2
13	3	79.3			3	77.2	6	78.4
14	1	80.4	2	81.6			3	79.5
15	1	81.6	3	85.0	1	78.2	5	81.3
16			2	87.3	2	80.2	4	82.8
17	2	83.9	1	88.5	2	82.2	5	84.6
18			1	89.6	2	84.2	3	85.7
19	2	86.2	2	91.9	1	85.1	5	87.5
20			1	93.1	1	86.1	2	88.2
21	1	87.3	2	95.4	4	90.1	7	90.7
22	1	88.5			3	93.1	4	92.2
23	1	89.6			3	96.0	4	93.7
24								
25	1	90,8					1	94.0
26								
27	2	93.1	1	96.5	2	98.0	5	95.8
28	1	94.2	1	97.7			2	96.6
29								
30	1	95.4	1	98.8			2	97.3
30+	4	100.0	1		2	100.0	7	100.0
TOTAL	87		87		101		275	
MEAN	8.9		7.2		8.1		8.0	

TABLE VI

TOTAL EXPERIENCE IN YEARS	Grade 4	Cumulative Percent	Grade 5	Cumulative Percent	Grade 6	Cumulative Percent	Inter-mediate	Cumulative Percent
0	5	6.0	6	6.8	4	3.9	15	5.5
1	4	10.7	5	12.5	7	10.8	16	11.3
2	7	19.0	9	22.7	7	17.6	23	19.7
3	7	27.4	3	26.1	5	22.5	15	25.1
4	1	28.6	3	29.5	3	25.5	7	27.7
5	2	30.9	2	31.8	3	28.4	7	30.2
6	2	33.3	2	34.1	2	30.4	6	32.4
7	3	36.9	5	39.8	4	34.3	12	36.8
8	2	39.3	2	42.0	8	42.1	12	41.1
9	1	40.5	3	45.4	2	44.1	6	43.3
10	3	44.0	2	47.7	2	46.1	7	45.9
11	5	50.0			3	49.0	8	48.8
12	2	52.4	3	51.1	5	53.9	10	52.4
13	2	54.7	1	52.3	6	59.8	9	55.1
14	2	57.1	1	53.4	1	60.8	4	57.1
15	1	58.3	2	55.7	3	63.7	6	59.3
16	2	60.7	6	62.5			8	62.2
17	4	65.5	1	63.6	2	65.7	7	64.8
18			1	64.8	1	66.6	2	65.5
19	2	67.8	3	68.2	1	67.6	6	67/7
20	2	70.2	3	71.6	2	69.6	7	70.3
21	1	71.4	1	72.7	2	71.5	4	71.7
22	1	72.6	1	73.8	2	73.5	4	73.2
23	3	76.2	2	76.1	3	76.4	8	76.1
24	1	77.4	1	77.2	3	79.3	5	77.9
25	2	80.0	1	78.4	1	80.4	4	79.4
26	2	82.1	3	81.8	5	85.3	10	83.0
27	1	83.3			1	86.2	2	83.7
28			1	82.9	2	88.2	3	84.8
29	1	84.5	1	84.1	1	89.2	3	85.9
30	1	85.7	6	90.9	1	90.2	8	88.8
31-35	5	91-6	3	94.3	5	95.1	13	93.6
36-40	5	97.6	4	98.8	3	98.0	12	97.8
40+	2	100.0	1	100.0	2	100.0	5	100.0
TOTAL	84		88		102		274	
MEAN	14.7		14.1		14.1		14.3	

TABLE VII

	Grade 7	Cumulative Percent	Grade 8	Cumulative Percent
0	29	20.4	42	25.3
1	22	35.9	22	38.6
2	16	47.2	15	47.6
3	12	55.6	12	54.8
4	11	63.4	8	59.6
5	7	68.3	13	67.4
6	2	69.7	5	70.4
7	9	76.0	7	74.6
8	5	79.6	5	77.7
9	3	81.7	3	79.5
10	2	83.1	2	80.7
11			2	81.9
12	3	85.2	5	84.9
13	1	85.9	2	86.1
14				
15	1	86.5	3	75.9
16	3	88.7	3	89.7
17	1	89.4	2	90.1
18	1	90.1	1	91.5
19	3	92.2	3	93.3
20	2	93.6	3	95.1
21	3	95.7	1	95.7
22			1	96.3
23	1	96.4	2	97.5
24	1	97.2		
25				
26	1	97.9	1	98.1
27				
28				
29				
30				
30+	3	100.0	3	100.0
TOTAL	142		166	
MEAN	2.8		2.8	

TABLE VIII

TOTAL EXPERIENCE IN YEARS	Grade 7	Cumulative Percent	Grade 8	Cumulative Percent
0	8	5.6	14	8.4
1	14	15.5	11	15.1
2	14	25.3	19	26.5
3	10	32.3	13	34.3
4	7	37.3	9	39.7
5	8	42.9	11	46.4
6	13	52.1	13	54.2
7	4	54.9	2	55.4
8	6	59.1	6	59.0
9	3	61.2	3	60.8
10	3	63.4	3	62.6
11	4	66.2	7	66.8
12	2	62.6	3	68.6
13	2	68.9	4	71.0
14	1	69.7	4	73.4
15	3	71.8	3	75.3
16	5	75.3	3	77.1
17	4	78.1	7	81.3
18	1	78.8	1	81.9
19	2	80.2	4	84.3
20	5	83.8	3	86.1
21	1	84.5	1	86.7
22	2	85.9	2	87.9
23	1	86.6	2	89.1
24				
25	1	87.3	1	89.7
26	3	89.4	1	90.3
27	1	90.1	2	91.5
28	2	91.5	2	92.7
29	2	92.9	2	93.9
30	4	95.7	2	95.1
31-35	3	97.8	2	96.3
36-40	3	100.0	4	98.7
40+			2	100.0
TOTAL	142		166	
MEAN	10.4		10.0	

TABLE IX

SCHOOL YEARS OF EXPERIENCE	Algebra Grades 7-8-9	Cumulative Percent	General Math[a]	Cumulative Percent
0	34	20.5	44	27.1
1	20	32.3	28	44.4
2	18	43.3	16	54.3
3	12	50.6	10	60.5
4	7	54.8	10	66.6
5	9	60.2	6	70.3
6	14	68.6	7	74.7
7	8	73.4	2	75.9
8	3	75.3	7	80.2
9	5	78.3	3	82.1
10	5	81.3		
11	2	82.5	3	83.9
12	1	83.1	2	85.1
13	2	84.3	4	87.6
14	1	84.9	1	88.2
15			2	89.5
16	3	86.7	2	90.7
17	2	87.9	2	91.9
18	1	88.5	1	92.6
19	1	89.1	2	93.8
20	8	93.9	5	96.8
21				
22	3	95.7		
23	1	96.3		
24			1	97.5
25				
26	1	96.9	2	98.7
27	1	97.5	1	99.3
28				
29				
30				
30+	4	100.0	1	100.0
TOTAL	166		162	
MEAN	6.4		5.0	

[a] General mathematics includes business and shop mathematics.

TABLE X

TOTAL EXPERIENCE IN YEARS	Grades 7-8-9 Algebra	Cumulative Percent	General Math[a]	Cumulative Percent
0	8	4.8	20	12.6
1	16	14.4	14	21.4
2	14	22.7	10	27.7
3	12	29.9	12	35.2
4	6	33.5	14	44.0
5	7	37.7	5	47.2
6	12	44.9	9	52.9
7	7	49.0	4	55.3
8	5	52.0	5	58.5
9	5	55.0	6	62.3
10	12	62.2	6	66.0
11	4	64.6	3	67.9
12	1	65.2	3	69.8
13	3	67.0	3	71.7
14	3	68.8	3	73.6
15	4	71.2	2	74.8
16	4	73.5	7	79.2
17	5	76.5	1	79.9
18	1	77.1		
19	2	78.3	3	81.8
20	4	80.7	2	83.0
21	3	82.5	1	83.6
22	2	83.7	4	86.2
23			2	87.4
24	1	84.3	1	88.0
25				
26	1	84.9	1	88.7
27				
28			1	89.3
29	6	88.5	4	91.8
30	1	89.1	4	94.3
31-35	7	93.3	5	97.5
36-40	7	97.5	1	98.1
40+	4	100.0	3	100.0
TOTAL	167		159	
MEAN	12.0		10.1	

[a] General mathematics includes business and shop mathematics.

TABLE XI

	Alg II	Cum Percent	Geom	Cum Percent	Trig. Adv. Math	Cum Percent	Total	Cum Percent
0	23	21.5	25	20.7	21	20.6	69	20.9
1	16	36.4	18	35.5	11	31.4	45	34.5
2	12	47.7	11	44.6	8	39.2	31	43.9
3	4	51.4	7	50.4	5	44.1	16	48.9
4	12	62.6	8	57.0	8	51.9	28	57.3
5	4	66.3	9	64.5	7	58.8	20	63.3
6	2	68.2	5	68.6	4	62.7	11	66.7
7	4	72.0	5	72.7	4	66.6	13	70.6
8	2	73.8	1	73.5	5	71.5	8	73.0
9	2	75.7	1	74.4	4	75.5	7	75.1
10	2	77.6	6	79.3	4	79.4	12	78.8
11	1	78.5	1	80.2	1	80.4	3	79.7
12								
13	3	81.3	3	82.6	1	31.3	7	81.8
14								
15	1	82.2					1	82.1
16								
17	3	85.0	2	84.3	1	82.3	6	83.9
18								
19	1	86.0	2	85.9			3	84.8
20	4	89.7	7	91.7	7	89.2	18	90.3
21	1	90.6	1	92.6	2	91.1	4	91.5
22	3	93.5	3	95.0	3	94.1	9	94.2
23	2	95.3	1	95.9	2	96.0	5	95.7
24								
25								
26			1	96.7			1	96.1
27								
28								
29	1	96.3	1	97.5	2	98.0	4	97.3
30								
30+	4	100.0	3	100.0	2	100.0	9	100.0
TOTAL	107		121		102		330	
MEAN	6.8		6.7		7,2		6.9	

TOTAL EXPERIENCE IN YEARS	Alg II	Cum Percent	Geom	Cum Percent	Trig. Adv. Math	Cum Percent	Total	Cum Percent
0	5	4.7	7	5.9	4	4.0	16	4.9
1	13	16.8	13	16.8	6	10.1	32	14.8
2	14	29.9	8	23.5	12	22.2	34	25.2
3	6	35.5	14	35.3	3	25.3	23	32.3
4	9	43.9	8	42.0	1	26.3	18	37.8
5	6	49.5	5	46.2	7	33.3	18	43.4
6	3	52.3	7	52.1	3	36.4	13	47.4
7	4	56.0	2	53.8	2	38.4	8	49.8
8	2	57.9	1	54.6	3	41.4	6	51.7
9	3	60.7	4	58.0	6	47.5	13	55.7
10	3	63.5	7	63.8	5	52.5	15	60.3
11			4	67.2	4	56.6	8	62.8
12	5	68.2	4	70.6	6	62.6	15	67.4
13	2	70.1	2	72.2			4	68.6
14	3	72.9	3	74.8	5	67.7	11	72.0
15			1	75.6	5	72.7	6	73.8
16	2	74.7	2	77.3	1	73.7	5	75.4
17			2	79.0	1	74.7	3	76.3
18	1	75.7					1	76.6
19	3	78.5	3	81.5			6	78.4
20	1	79.4			1	75.8	2	79.1
21	2	81.3	1	82.3	1	76.8	4	80.3
22	3	84.1	4	85.7	4	80.8	11	83.7
23	1	85.0	2	87.4	1	81.8	4	84.9
24	1	85.9	1	88.2	1	82.8	3	85.8
25								
26	1	86.9	3	90.7	1	83.8	5	87.4
27								
28					1	84.8	1	87.7
29			1	91.6	2	86.9	3	88.6
30	3	89.7	1	92.4	2	88.9	6	90.4
31-35	3	92.5	3	94.9	5	93.9	11	93.8
36-40	5	97.1	3	97.4	2	96.0	10	96.9
41+	3	100.0	3	100.0	4	100.0	10	100.0
TOTAL	107		119		99		325	
MEAN	11.4		10.6		13.0		11.5	

APPENDIX E

TABLE I

Majors	7 & 8	General Math	Algebra 7 & 8	Algebra II	Geometry	Advanced Math	Total
Agriculture	11	1	2	1	1	1	17
Bio. Science	36	15	9	8	5	8	81
Business Ed.	13	5	7	5	7	3	40
Drama	2	2	0	0	1	0	5
Elementary	40	9	3	3	2	4	61
English	23	11	11	4	4	1	54
Language	1	5	6	2	3	4	21
Home Ec.	5	3	0	0	0	0	8
Ind. Arts	4	0	1	0	1	0	7
Music	2	0	2	1	1	0	6
P. E.	14	7	9	2	2	2	36
Phys. Sc.	25	13	9	8	7	9	71
Psychology	1	1	1	0	0	0	3
Social Sc.	56	12	29	12	16	14	139
Natural Sc.	6	2	2	0	0	0	10
Religion	2	1	2	0	2	0	7
Education	3	1	3	1	2	2	12
General Sc.	7	1	3	0	0	0	11
Philosophy	0	0	1	1	1	0	3
TOTAL	251	89	101	48	55	48	592

APPENDIX F

TABLE I

Majors	Agriculture	Art	Biological Sc.	Business Ed.	Drama	Elementary Education	English
Agriculture							
Art							1
Biological Science	1						
Business Education							
Drama							
Elementary Education			1				3
English					1	22	
Foreign Language							2
Home Economics			1			3	
Industrial Arts						1	
Mathematics	1		1	3		3	3
Music						1	
Physical Education		1	1				1
Physical Science			4			1	
Psychology						1	
Social Science		1	1			26	18
Special Education						2	
Speech						2	
Natural Science			1				1
Religion							
Education			2				
Library Science							
General Science			1				
Philosophy							
Sub Total	2	2	13	3	1	62	29

TABLE I (cont'd)

						Majors					
For. Lang	Home Ec	Ind. Arts	Math	Music	P.E.	Physical Science	Psych.	Social Sc.	Special Ed.	Sub Total	Grand Total
										0	2
										1	3
			1			1				3	16
										0	3
										0	1
	1		1						1	7	69
	1									24	53
										2	6
										4	8
	1									2	4
3		1				1				16	40
										1	2
			1					1		5	9
	1		4							10	13
										1	2
1		1	13		4					65	69
							1	1		4	5
										2	2
			1					2		5	5
			1							1	1
			2	1		1				6	6
										0	0
										1	1
										0	0
4	4	2	24	1	4	3	1	4	1	160	320

TABLE II

Majors

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
1	1										1		1											3
2						9	2		1	1	1					1	1	1						17
3	4		3			13	2	1	4		21		6	2		9					1			66
4				2		2	3				10					1					1			19
5																								
6						56	7	1	3			1				10	1							79
7			8	7	1	77	10	1	7	3	53			7	1	71	3	1		2	1	1	2	256
8			1	1		5	10	4	1		7	1	1			6				1				38
9						9	1	2			1					4								17
10						1	1		1		1			1										5
11	3		24	6		9	10	2	1		1	2	5	22	1	22			5	1	5		3	122
12			1	1		12	1		1		3	4	3			6								32
13			1	1		9	3		2		14			2		15	1				1			49
14	2		11	2		7	3		6		35		1	1		7			1	1			1	78
15	1	1				12	4	1	1		3					5								28
16	2	2	11	11	2	128	46	3	7	1	52	1	6	4	1	14				3	1		1	296
17						2							1		1		1							5
18				1		3	2				4					1							1	12
19H	1					3	2		3		27					1			1					38
20H	1	1	2	1							5					2					1			13
21H						2																		2
22H			1			2		1			1			1		1								7
23H						1					1													2
24H						2																		2
Total	15	4	63	33	3	364	107	16	38	5	241	9	24	40	4	176	7	2	7	8	11	1	8	1186

Key

1. Agriculture
2. Art
3. Biological Science
4. Business Education
5. Drama
6. Elementary Education
7. English
8. Foreign Language
9. Hcme Economics
10. Industrial Arts
11. Mathematics
12. Music
13. Physical Education
14. Physical Science
15. Psychology
16. Social Studies
17. Special Education
18. Speech

19H. Natural Science
19V. General Science
20H. Religion
20V. Education
21H. Education
21V. Liberal Education
22H. Library Science
22V. Bible
23H. General Science
23V. Philosophy
24H. Philosophy
24V. Library Science

APPENDIX G

TABLE I

Alabama Colleges	NSF Participants
Alabama, University of	34
Alabama College	1
Alabama A & M	12
Auburn	25
Birmingham Southern	5
Florence State	12
Jacksonville State	4
Livingston State	1
Miles	7
Spring Hill	1
TOTAL	102

TABLE II

Regional Colleges	NSF Participants
Albany State of Georgia	3
Atlanta	2
Chattanooga	1
Emory	2
Georgia	1
L. S. U.	1
Mercer	1
Nashville	2
North Carolina A & T	1
Peabody	1
South Carolina	4
Southern	1
Southern Mississippi	1
Saint Augustine	1
TOTAL	22

TABLE III

Non-Regional Colleges	NSF Participants
Arkansas	1
Baldwin Wallace	1
Boston College	1
Bowling Green	1
Bucknell	1
Carelton College	2
Depauw	1
Fresno State	1
Georgetown	1
Illinois	2
Kansas	2
Kansas State	1
Lafayette	3
Miami of Ohio	1
Nebraska	1
Notre Dame	1
Oberlin	1
Oklahoma	1
Oklahoma Northwestern	1
Penn State	1
Southern Illinois	1
San Jose State	1
Tulsa	2
Utah	1
Western Reserve	1
TOTAL	31

APPENDIX H

TABLE I

Courses	Frequency
Grade 1	95
Grade 2	81
Grade 3	102
Grade 4	88
Grade 5	88
Grade 6	102
Grade 7	142
Grade 8	166
Algebra-Grade 7	4
Algebra-Grade 8	9
Algebra-Grade 9	154
General Mathematics-Grade 9	104
General Mathematics	25
General Mathematics-Grade 12	15
Business Arithmetic	17
Special Education	6
Shop Mathematics	1
Algebra II	107
Plane Geometry	69
Solid Geometry	5
Unified Geometry	47
Trigonometry	44
Advanced Mathematics-Grade 11	14
Advanced Mathematics-Grade 12	44

APPENDIX I

TABLE I

CLASS SIZE	Grade 1	Cum Percent	Grade 2	Cum Percent	Grade 3	Cum Percent	Primary 1-3	Cum Percent
0-10	4	4.3	2	2.5	4	4.0	10	3.6
11-15	6	10.6	6	9.9	5	8.9	17	9.8
16-20					3	11.9	3	10.9
21	1	11.7			1	12.9	2	11.6
22	1	12.8					1	12.0
23	1	13.8			1	13.9	2	12.7
24	2	16.0	1	11.1	3	16.8	6	14.9
25	8	24.5	5	17.3	2	18.8	15	20.3
26	4	28.7	1	18.5	1	19.8	6	22.5
27	4	33.0	5	24.7	4	23.8	13	27.2
28	9	42.6	3	28.4			12	31.5
29	3	45.7	3	32.1	2	25.7	8	34.5
30	18	64.9	11	33.3	9	34.7	38	48.2
31	1	66.0			1	35.6	2	48.9
32	4	70.2	8	55.6	12	47.5	24	57.6
33	5	75.5	6	63.0	12	59.4	23	65.9
34	1	76.6	3	66.7	7	66.3	11	69.9
35	8	85.1	10	79.0	13	79.2	31	81.2
36	2	87.2	2	81.5	5	84.2	9	84.4
37	2	89.4	5	87.6	4	88.1	11	88.4
38	1	90.4	1	88.9	5	93.1	7	90.9
39								
40	4	94.7	3	92.6	2	95.0	9	94.2
41	1	95.7			1	96.0	2	94.9
42	2	97.9	1	93.8	1	97.0	4	96.4
43								
44								
45	1	98.9	1	95.1			2	97.1
46			1	96.3	1	98.0	2	97.8
47			2	98.8	1	99.0	3	98.9
48								
49								
50	1	100.0	1	100.0	1	100.0	3	100.0
TOTAL	94		81		101		276	

TABLE I (cont'd)

Grade 4	Cum Percent	Grade 5	Cum Percent	Grade 6	Cum Percent	Grades 4-6	Cum Percent
3	3.4	1	1.1	2	2.0	6	2.2
3	6.8	1	2.3	4	6.0	8	5.1
3	10.2	7	10.2	7	13.0	17	11.2
		1	11.4	1	14.0	2	19.2
1	11.4	1	12.5			2	12.7
4	15.9	2	14.8	3	17.0	9	15.9
3	19.3	5	20.5	6	23.0	14	21.0
1	20.5	1	21.6	1	24.0	3	22.1
1	21.6			1	25.0	2	22.8
1	22.7	4	26.1	6	31.0	11	26.8
		1	27.3	3	34.0	4	28.3
15	39.8	15	44.3	19	53.0	49	46.0
2	42.0	2	46.6			4	47.5
8	51.1	5	52.3	10	63.0	23	55.8
3	54.5	7	60.2	5	68.0	15	61.2
4	59.1	2	62.5	5	73.0	11	65.2
18	79.5	12	76.1	7	80.0	37	78.6
1	80.7	5	81.8	6	86.0	12	83.0
4	85.2	4	86.4	4	90.0	12	87.3
4	89.8	2	88.6	4	94.0	10	90.9
1	90.9	1	89.8	1	95.0	3	92.0
4	95.4	5	95.4	5	100.0	14	97.1
1	96.6	2	97.7			3	98.2
		1	98.9			1	98.5
1	97.7					1	98.9
		1	100.0			1	99.3
1	98.9					1	99.6
1	100.0					1	100.0
88		88		100		276	

TABLE II

CLASS SIZE	Grade 7	Cum Percent	Grade 8	Cum Percent	General[a] Math	Cum Percent
0-10	5	3.5	7	4.2		
11-15	6	7.7	4	6.6	1	0.6
16-20	6	12.0	8	11.4	8	5.7
21	1	12.7	3	13.2	2	7.0
22			2	14.4	3	8.9
23	2	14.1	6	18.1	7	13.3
24	3	16.2	6	21.7	5	16.5
25	10	23.2	11	28.3	12	24.1
26	8	28.9	8	33.1	8	29.1
27	3	31.0	3	34.9	7	33.5
28	9	37.3	14	43.3	10	40.0
29	7	42.2	9	48.8	6	43.7
30	24	59.1	33	68.6	38	67.7
31	4	62.0	1	69.2	4	70.3
32	8	67.6	11	75.9	13	78.5
33	5	71.1	4	78.3	4	81.0
34	4	73.9	4	80.7	10	87.4
35	18	86.6	22	93.9	15	96.8
36	7	91.5	3	95.7	3	98.7
37	2	92.9				
38	5	96.4	2	96.9	1	99.4
39	1	97.2	1	97.5		
40	4	100.0	3	99.3	1	100.0
41						
42						
43						
44			1	100.0		
45						
46						
47						
48						
49						
50						
TOTAL	142		166		158	

[a] General mathematics also includes shop mathematics and business mathematics.

TABLE III

CLASS SIZE	Alg I	Cum Percent	Alg II	Cum Percent	Geom	Cum Percent	Adv. Math	Cum Percent
0-10	3	1.8	1	1.0	2	1.7		
11-15	3	3.6	2	3.0	3	4.1	1	1.1
16-20	11	10.2	10	13.0	13	14.9	18	20.0
21	3	12.0	2	15.0	2	16.5	2	22.1
22	4	14.4	3	18.0	7	22.3	8	30.5
23	8	19.1	8	26.0	9	29.7	11	42.1
24	10	25.1	10	36.0	8	36.3	10	52.6
25	19	36.5	13	49.0	20	52.9	8	61.0
26	7	40.7	3	52.0	3	55.3	3	64.2
27	10	46.6	7	59.0	9	62.8	5	69.4
28	6	50.2	9	68.0	9	70.2	7	76.8
29	8	55.0	1	69.0	2	71.7	1	77.8
30	38	77.7	20	89.0	22	90.0	18	96.8
31	1	78.3			2	91.7		
32	11	84.9	6	95.0	5	95.8	1	97.8
33	5	87.9	2	97.0			1	98.9
34	4	90.3			1	96.6		
35	8	95.1	2	99.0	2	98.3		
36	1	95.7			1	99.1	1	100.0
37	1	96.3						
38								
39								
40	2	97.5	1	100.0	1	100.0		
41								
42								
43								
44	4	100.0						
TOTAL	167		100		121		95	

APPENDIX J

TABLE I

Subject Other Than Mathematics	Frequency Taught By Mathematics Majors
Biological Science	3
Business Education	2
Data Processing	1
Drama	1
Driver Education	1
English	3
Foreign Language	2
General Science	8
Guidance	2
Industrial Arts	1
Music	1
Physical Education	8
Physical Science	16
Reading	1
Social Science	6
Total	56

APPENDIX K

TABLE I

Course	Frequency
1. High School Algebra I	881
2. High School Algebra II	402
3. Plane Geometry	739
4. Solid Geometry	312
5. Trigonometry	445
6. Unified Geometry	20
7. Advanced Math - 11	160
8. Advanced Math - 12	162
9. College Algebra I	606
10. College Algebra II	429
11. Modern Algebra	222
12. College Geometry	193
13. Analytic Geometry	314
14. Calculus I	309
15. Calculus II	265
16. Calculus III	154
17. Calculus IV	66
18. Non-Eucildean Geometry	69
19. Probability	74
20. Abstract Algebra I	20
21. Abstract Algebra II	21
22. Topology	13
23. Statistics	191
24. Finite Mathematics	50
25. Differential Equations	144
26. Analysis	71
27. Projective Geometry	18
28. Math. Methods for Elementary Teach.	84
29. Theory of Equations	52
30. General Mathematics	33
31. Business (Finance) Mathematics	43
32. Theory of Numbers	32
33. Applied Mathematics	17
34. Engineering Mathematics	5
35. History of Mathematics	7
36. Math. for Secondary Schools	9
37. Computers	5
38. Complex Variables	4
39. Vectors	7
40. Matrix Theory	2
41. Numerical Analysis	1
42. Linear Algebra	2
43. Foundations of Mathematics	1
44. More than three courses above calculus not listed on the questionnaire	10

TABLE II

Course Number[a]	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
1	87	73	90	78	76	82
2 or 7	37	36	40	36	38	49
3 or 6	65	65	69	56	54	70
4	20	21	19	12	20	21
5	17	16	24	22	16	24
8	8	10	10	8	15	15
9	42	27	35	39	45	50
10	16	13	20	17	17	22
11	4	3	3	5	6	6
12	5	6	3	7	1	2
13	4	2	1	3	4	4
14	2		3	5	4	
15	2		1	4	2	
16				3		
19 or 23	5	6	7	4	8	8
20				1		
21				1		
24			1	1	1	1
25	1				1	
27				1		1
28	15	15	18			
29				1	1	
30	7	5	2	2	3	2
31	4	1	1	2	4	2
32						1
33	1	3		2	3	3
34					1	
35					1	

[a] Table I of Appendix K identifies the courses by number.

TABLE III

Course Number[a]	Grade 7	Grade 8	General Math	Algebra I	Geometry
1	141	160	144	154	117
2 or 7	96	125	121	151	121
3 or 6	118	150	134	162	118
4	49	75	69	99	68
5	92	118	111	147	117
8	25	28	26	27	19
9	110	138	124	153	119
10	73	80	80	102	78
11	44	55	72	97	71
12	40	55	59	85	68
13	69	99	105	137	109
14	65	97	113	142	111
15	54	82	96	127	94
16	28	45	54	74	51
17	8	18	26	30	30
18	13	19	22	37	35
19 or 23	52	78	85	103	73
20	14	21	33	56	43
21	9	11	12	19	19
22	3	2	4	8	4
24	8	12	16	25	20
25	33	45	51	65	59
26	12	19	21	37	32
27	3	2	3	7	10
28	2	3			
29	14	13	22	21	18
30	7	6	2	2	2
31	9	10	5	7	7
32	2	3	1	3	4
33	3	2	1		1
34	1	1	2	2	3
35	1	2	2	2	3
36	2	1	3	3	2
37			4	3	2
38		2	1	2	
39	2	2	1	1	2
40		1	1		1
41	1				
42		1		1	
43				1	1
44	2	2	4	6	7

[a] Courses are identified by Table I of Appendix K.

TABLE IV

Course Number[a]	Algebra II	Advanced Mathematics
1	107	99
2 or 7	104	102
3 or 6	107	102
4	65	62
5	102	97
8	17	28
9	102	97
10	78	71
11	70	68
12	52	60
13	96	89
14	97	92
15	82	88
16	55	57
17	26	34
18	29	34
19	21	22
20	41	49
21	16	26
22	3	5
23	51	41
24	18	11
25	51	52
26	33	37
27	4	11
29	14	13
30	2	1
31	4	3
32	4	3
34	2	1
35	5	3
36	3	1
37	2	4
38	2	
39	2	5
40	1	
44	4	6

[a] Table I of Appendix K identifies the courses by number.